







*Robert Cory.*



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# A SYSTEM OF GYNECOLOGY AND OBSTETRICS

BY AMERICAN AUTHORS.

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PHYSICIANS OF PHILADELPHIA, ETC.

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VOLUME II.—PART I.

*ILLUSTRATED WITH WOOD ENGRAVINGS.*



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# THE DISEASES OF THE VAGINA.

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IN this article the inflammatory and other diseases of the vagina, including neoplasms, which the practitioner is called upon to treat will be described in full, and the more important congenital and traumatic lesions, excepting fistula, will be treated under their appropriate heads.

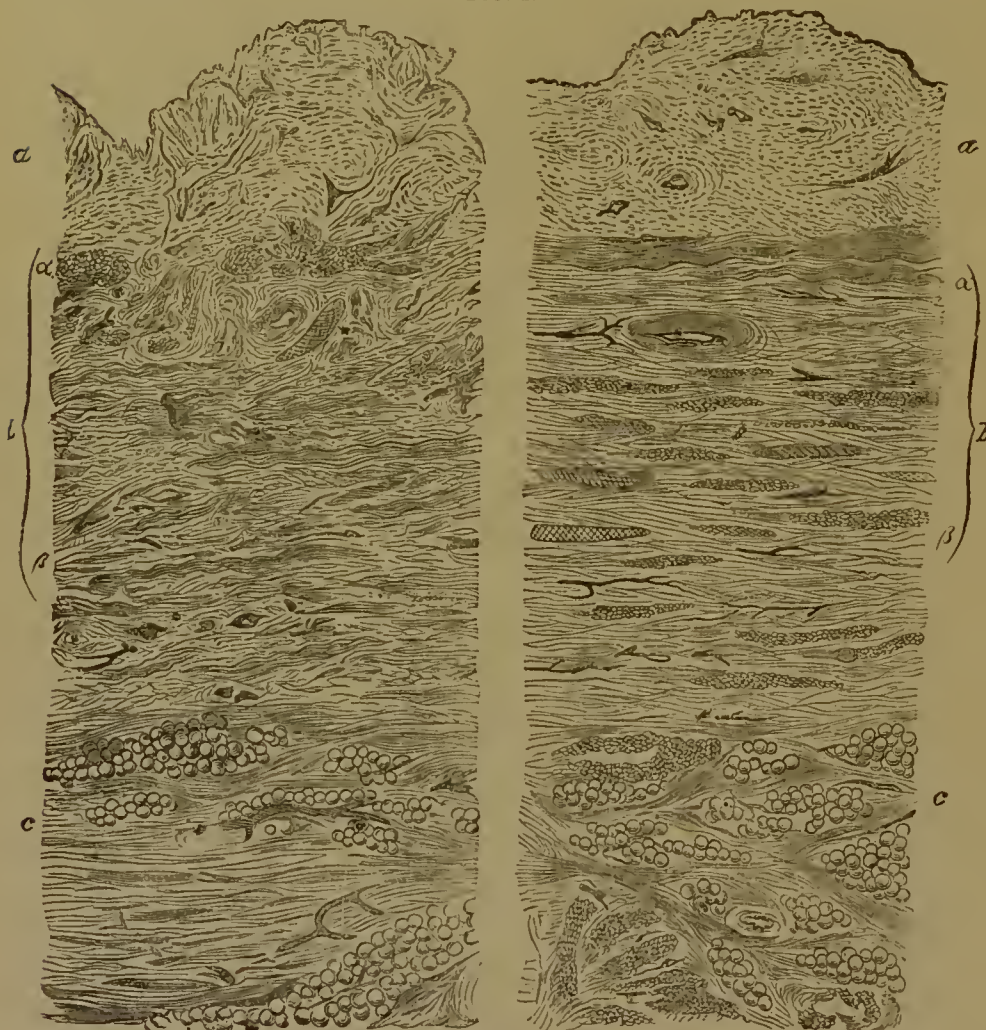
ANATOMY.<sup>1</sup>—The vagina is a musculo-membranous canal which extends upward and forward from the vulva to the cervix uteri, which its upper extremity embraces. Its average length is 3.1 inches along the anterior wall, 3.9 inches along the posterior wall; its diameter varies from 1.3 to 2.6 inches. Its general shape has been compared by Savage<sup>2</sup> to that of a flexible tube diminished to nearly half its length by a string passed through one of its sides from end to end. The tense and slightly projecting ridge thus formed in front is called the anterior column of the vagina, and constitutes the vesico-vaginal septum. Its tension causes the surface to be thrown into transverse folds or rugæ. The posterior column consists of a less defined ridge running up the centre of the posterior wall. The walls, which are very elastic and distensible, are composed of three distinct coats or layers: 1, an external coat of fibrous elastic tissue, with connective tissue; 2, a middle coat of unstriped muscular fibres, longitudinal superficially, and extending from the external layer of the muscular coat of the cervix uteri, with which they are continuous, to the front of the ischio-pubic rami: beneath these is a layer of interlacing fibres, forming what Prof. Charpentier calls a "plexiform network;" 3, an internal or superficial coat of mucous membrane, pink or reddish in color, about one-fifth of an inch thick, intimately united with the muscular coat, and covered with strata of pavement epithelium, which overlies its papillæ and muciparous glands. Sappey and C. Robin have failed to find these glands, and deny their existence, but Huschka and Farre have discovered them in great numbers. The vaginal arteries and arterioles are derived from the internal pudic, the vesical, and from the hypogastric through the vaginal branch of the uterine. The veins

<sup>1</sup> See also article on "Anatomy" in Vol. I.

<sup>2</sup> *Anatomy of Female Pelvic Organs*, London, 1870.

originate in the papillæ, and terminate in the large lateral venous plexus which is found along either side of the vagina. Its nerves, which are much less sensitive than cutaneous branches, are derived from the hypo-

FIG. 1.



Longitudinal Section of Vaginal Wall.

Transverse Section of Vaginal Wall.

a, mucous membrane; b, muscular layer, including (α) circular and (β) longitudinal fibres; c, fibrous layer, containing fat (Breisky).

gastric plexus. The vaginal lymphatics empty into the large glands on either side of the pelvic cavity, and finally into the inguinal glands.

The functions served by the vagina are to give passage to the menstrual flow and to the fœtus during parturition, but chiefly as an organ for coition.

### VAGINITIS.

By vaginitis is meant inflammation of the mucous membrane of the vagina, which, as elsewhere, may be acute, subacute, or chronic. Its



synonyms are colpitis, clytritis, and, in the older works, blennorrhœa and blennorrhagia. Its varieties are: I. Simple vaginitis, or catarrhal vaginitis; II. Specific vaginitis, "gonorrhœal;" III. Aphthous or diphtheritic vaginitis; IV. Granular (glandular, papular) vaginitis, very rare. But as it is absolutely impossible by any clinical signs to distinguish specific vaginitis or gonorrhœa in women from simple vaginitis of an acute or virulent grade, the two will be described together.

This may seem a bold statement to advance. The most careful systematic writers make, it is true, an attempt to differentiate between these two conditions. Thus, Thomas<sup>1</sup> emphasizes the "great virulence and acuity of development," the "marked urethral complication," "copious purulent discharge," "transmission to the male from coition," etc., as indicative of *specific* vaginitis, but in the next sentence admits that these symptoms "will exist in cases certainly of non-specific character. On two occasions I have seen them all attend cases of vaginitis, excited by accidental contact of chromic acid with the vaginal walls."

Dr. Jenks,<sup>2</sup> after stating that specific vaginitis "more frequently than other varieties is liable to give rise to violent urethritis, cystitis, salpingitis, ovaritis, and pelvic peritonitis," admits that "it is sometimes not only difficult, but quite impossible, to determine whether a case be one of simple inflammation or of gonorrhœal origin." Edis<sup>3</sup> is so doubtful as to diagnosis that he thinks it our duty "always to lean to the side of charity when the question is one of chastity." Dr. J. W. White,<sup>4</sup> in an excellent review of the question in its bearing upon gonorrhœa, concludes by the assertion that "it is never safe or proper to say that a given urethritis, vaginitis, or vulvitis has resulted from impure sexual intercourse." Dr. Matthews Duncan,<sup>5</sup> in discussing simple and specific vaginitis, says, explicitly: "You cannot decide absolutely whether a case is venereal or not. . . . I have seen cases which were certainly not venereal bear every character of the ordinary venereal disease. I do not say there is no distinction, but only that the distinction cannot be made out by the practitioner so as to justify him, from his own inquiries into a case, in giving a decided opinion on the subject."

Some years ago, when I had charge of the large venereal wards in the (New York) Charity Hospital, I made very numerous and careful clinical examinations to test the possibility of this distinction, with exceptional facilities for such an object. The result was absolutely negative. Since then a like inference has resulted from equally careful observation of my cases in the Woman's Hospital and in private

<sup>1</sup> *Diseases of Women*, 1880, p. 216.

<sup>2</sup> *Pepper's System of Medicine*, 1886, iv. 371.

<sup>3</sup> *Dis. of Women*, Am. ed., 1882.

<sup>4</sup> *Ashhurst's International Encyc. of Surgery*, ii. 329.

<sup>5</sup> *Med. Times and Gazette*, June 26, 1880.

practice. That gonorrhœa, either in man or woman, is a "specific" disease, in the proper sense of specificity, I do not believe; nor is it easy to comprehend how any pathologist can hold that view in the light of our present knowledge.<sup>1</sup> That a simple virulent vaginitis can be distinguished from one of "gonorrhœal" origin I equally disbelieve; and it needs but a moment's reflection to perceive the vast importance of this in its bearing upon the happiness of the families we may be called upon to advise. The obvious inference each reader can draw for himself.

**ETIOLOGY AND PATHOLOGY.**—The common causes of simple vaginitis in the adult are exposure to cold and wet, irritating or over-stimulating vaginal injections, the misuse of pessaries, excess of coition, as in newly-married women or among prostitutes, retained or decomposing secretions, gonorrhœal infection from the male urethra, and certain diseased blood-states, as the exanthematous eruptions. In children and young girls more or less acute attacks of vaginitis are also excited by ascarides passing from the rectum into the vagina, by want of cleanliness, exposure to cold, and as a sequence of scarlatina and measles. In the aged it occurs sometimes in connection with atrophy of the uterus, and is thought by Hildebrandt and Jenks<sup>2</sup> to be due to the retrogressive processes which physiologically follow the menopause. In such cases the epithelium sometimes sloughs in large patches, and adhesion of the raw surfaces with practical atresia of the vagina ensues.

The pathological changes are those that characterize inflammation of all mucous membranes. The surface at first becomes highly vascular and bright red from distension of the arterioles; it is dry, glistening, and tender; the epithelium gives way in patches and is detached, the

FIG. 2.



Inflammation (simple) of Vagina (Ruge).

raw surface either bleeding if subjected to friction, or exuding a mucus, or, during epidemics of diphtheria, being quickly covered with a grayish diphtheritic deposit. More rarely, an epithelial cast or mould of a large section of the vagina, possibly of the whole canal, is thrown

<sup>1</sup> *Vide*, inter alia, White, *loc. cit.*, pp. 326 *et seq.*, for a full and lucid statement of this subject.

<sup>2</sup> *Loc. cit.*, p. 368.

off spontaneously or is washed away by the vaginal douche. Thomas<sup>1</sup> likens this "to the dysmenorrhœal membrane which is occasionally expelled from the uterus." These changes may begin in any portion of the canal, but usually commence near the vulva.<sup>2</sup>

After about twenty-four hours a secretion of muco-pus exudes from the congested surface, to be quickly followed by a more acrid and offensive pus in copious amount. When retained in the upper vagina this soon undergoes decomposition, becomes greenish, and excoriates all the mucous surface with which it comes in contact. In one or two weeks, if no treatment be applied, this secretion again becomes muco-purulent, more benign in character, and less copious; and in this condition it remains in feeble constitutions for many months.

All samples of decomposing pus from cases of vaginitis contain bacteria; but whether these be called the "*Trichomonas vaginalis*" of Donné, or the "gonococcus" of Neisser, E. Rumm, and Noeggerath,<sup>3</sup> is immaterial, as they are not pathognomonic of any form of vaginitis.

In any case, but chiefly when the last stage is neglected, these inflammatory processes may, and sometimes do, extend by simple continuity of surface through the uterus into the Fallopian tubes, to the ovaries and pelvic peritoneum, into the vulvo-vaginal glands, and, more rarely, into the urethra and bladder. True cystitis as a result of and form of vaginal inflammation, although often spoken of, is uncommon.

**SYMPTOMS, DURATION, AND PROGNOSIS.**—Vaginitis is rarely seen by the physician in its very earliest stages. In acute cases the labia are found swollen and tender; the ostium vaginae bulging and full, especially noticeable where any prolapse of the vagina coexists; the surface of the canal bright red or dusky red, bathed with pus, hot, and somewhat throbbing to the touch. If the walls be gently separated, a more copious flow of yellow and somewhat fetid pus will occur, and with the aid of a speculum these conditions will be seen to have extended to the cervix. The latter is also commonly swollen, turgid with blood, while the os is often occluded with a thick plug of tenacious mucus. The vaginal surface is usually very tender to the touch, often exquisitely so, and in a few cases a thorough examination is impracticable without anæsthesia. Sensitiveness is commonly greatest at the

<sup>1</sup> *Op. cit.*, p. 213.

<sup>2</sup> Compare Eppinger in *Zeitschrift f. Heilkunde*, iii. 177.

<sup>3</sup> Although I deny that any clinician can diagnosticate a case of simple vaginitis from one "of gonorrhœal origin," and also that gonorrhœa is a specific disease as distinguished from other forms of acute urethral inflammation, I by no means question the accuracy of Dr. Noeggerath's views as to the frequency of salpingitis, occlusion of the tubes, ovaritis, perimetritis, and consequent sterility from women being contaminated by urethral discharges in their husbands. How far this *materies morbi* may remain latent (*vide Die Latente Gonorrhœa im Weiblichen Geschlecht*, Bonn, 1873, and *Trans. Am. Gyn. Society*, i. 268 *et seq.*) in the man, as Noeggerath claims, I cannot say; but every year's observation the more convinces me that, in his main contention, that learned writer is correct.

vulva, often with much itching or pruritus, and, in most cases, vulvitis complicates the vaginal inflammation. Dysuria is more often due to the scalding effect of acid urine upon the inflamed fourchette than to true urethritis.

The duration of such an attack is usually from two to three weeks in its acute form; in a subacute or chronic state, as a muco-purulent leucorrhœa, it may last indefinitely.

The prognosis, with rest and proper treatment, is always favorable in acute cases, but chronic vaginitis in tubercular or otherwise cachectic subjects will often baffle all efforts to cure it. The complications of serious import are, as already implied, vulvitis, inflammation and abscess of Duverney's glands, endometritis, inflammations of the uterine appendages, and peritonitis.

TREATMENT.—Rest, cleanliness, astringent douches, separation of the vaginal surfaces,—these are the cardinal indications for treatment.

The patient must, in the acute stage, be kept in bed, for without the maintenance of complete rest and the recumbent position very little can be attained. The bed-covering should be as cool, especially at night, as is consistent with safety and comfort. If there be fever, mild diaphoretics and saline cathartics should be used, and in all cases the rectum and colon should be kept free from fecal accumulations. If there be much pain, which is rare, anodyne (rectal) suppositories may be used after the laxative has acted; but the distress accompanying vaginal examination or applications can best be relieved by a 4 per cent. solution of cocaine hydrochlorate. At regular intervals—every few hours I am accustomed to direct—a copious and carefully administered vaginal douche of hot water should be administered. In hospitals and where the patient can have a nurse or even an intelligent family attendant this should never be done by the patient herself; for it is fatiguing, and obviously liable to cause her to become chilled in arranging and rearranging the apparatus. When travelling, or when, for any reason, it is quite impossible to obtain other assistance, the alternatives described by Prof. Palmer in the first volume of this work (pp. 556 *et seq.*) may be used with advantage, and to these the reader is referred. After the first intensity of the attack is thus subdued—in about forty-eight hours—it is generally recommended that the patient be placed on the left side, the vagina gently exposed with a Sims speculum, and the whole surface carefully painted with a solution of nitrate of silver, from ʒj to ʒj to ʒj strong. This I have faithfully done many times, and with others can aver that it very markedly diminishes the distressing sense of burning and constriction in the vagina. But I have never seen a case cured by it (by repeated applications, I mean) or perceptibly advanced toward a cure. I would use it, therefore, only where the discomfort just noted is a marked feature. But usually a



more efficient plan will be the following: Retract the posterior wall very gently with a Sims speculum—in the semiprone position, and using cocaine freely if need be—and, after washing out the vagina carefully with a weak disinfectant (mercuric bichloride solution, 1 : 5000, or solution of carbolic acid, 1 : 100), apply a sufficient number of strips of lint, cut one inch wide by six inches long and soaked in a weak astringent solution, to completely cover the vaginal surface. In this the position of the speculum must be shifted once, but that is easily accomplished. The lint may be saturated with either a solution of muriate of ammonia, ʒij to Oj, or boracic acid, ʒj to Oj, with or without a pinch of chloride of sodium, or tannin ʒss to Oj, or the same amount of alum; alum, however, is often harsh and irritating, and tannin less useful than the other astringents. The strips of lint should project at least a half inch from the vulva, and are to be left *in situ* for twenty-four hours. When removed, the douche is to be repeated, then the disinfectant lotion and the lint dressing applied as before. Cotton, either absorbent or non-absorbent, is less manageable, and should not be used if good “English” sheet lint can be had. After the third daily dressing of this kind the vaginal surface should be carefully dried (with absorbent cotton and without rubbing), and thoroughly dusted with iodoform powder before the soaked lint is applied; this is excellent, but I have not found an entirely dry dressing to answer so well. Dr. Engelmann, however, strongly advocates its use.<sup>1</sup>

In the great majority of severe cases one week, or at most ten days, of this treatment will be found to effect an absolute cure. When large strips or casts of the epithelium have been completely lost, an additional week will be needed. Abstinence from coition and especial cleanliness with tepid douching during menstruation should be enjoined for a month after recovery, for few maladies are more likely to relapse.

In aphthous, croupous, or diphtheritic vaginitis, first described by Rokitsansky, which commonly occurs when the patient is developing or recovering from diphtheria, or in diphtheritic epidemics or in puerperal septicæmia, the conditions previously described all exist, plus a local diphtheria. As patches of epithelium exfoliate, grayish deposits of diphtheritic membrane take their place; these quickly extend until, within forty-eight hours, most of the canal is covered with this deposit. Much constitutional disturbance occurs, with feeble pulse and high temperature.<sup>2</sup>

The treatment is as in simple acute vaginitis, with the stimulation and tonics essential in all diphtheritic disease. Vaginal douches of a weak solution of sulphite of soda (ʒj to Oj) and its more concentrated

<sup>1</sup> *Amer. Journ. Obst.*, June and July, 1887.

<sup>2</sup> In an epidemic of puerperal septicæmia in the lying-in department of the N. Y. Foundling Asylum in 1884, I have seen it complicate every successive case that occurred.



application with the lint tampon (3ij to Oj) have seemed to me of more benefit than anything else. In puerperal cases the tampon is of course omitted.

GRANULAR or FOLLICULAR VAGINITIS, which is chiefly due to the general venous stasis of the blood caused by the pressure of advancing pregnancy, is so rare as to be almost a medical curiosity. Deville first termed it "vaginite granuleuse;" and, as its name implies, its chief characteristic is the minute papillary or "granular" elevations which stud the surface of the vagina. In the few imperfectly developed cases I have seen (three in number, all in late pregnancy) these have been dusky red in color, attended with much itching and burning, and exuding a thin mucopurulent discharge. Dr. Thomas mentions a more striking case he once saw in consultation where the vaginal surface simulated malignant disease. The treatment is as for simple vaginitis. In pregnancy it rarely disappears completely until after confinement.

Learned German authors make many other subdivisions of vaginitis, such as vesicular, emphysematous, exfoliative, septic, erysipelatous, and dysenteric vaginitis;<sup>1</sup> but into these it is unnecessary to enter in a short practical treatise like the present.

#### MALFORMATIONS.

Under this heading are generally included—

- a. Congenital absence of the vagina;
- b. Atresia, congenital or acquired;
- c. Cicatricial bands;
- d. Double vagina.

Complete absence of the vagina is, fortunately, extremely rare, and when it does occur it usually accompanies absence or rudimentary development of the uterus and ovaries. Such a condition is always an arrest of development, from failure of union or coalescence of the ducts of Müller. In the embryo these make their appearance on the front of the Wolffian bodies from the fourth to the sixth week. Superiorly, they remain separate as the Fallopian tubes; inferiorly, they unite to form the uterus and vagina. Imperfection of this union results, in accordance with its degree, in non-development or imperfect development of these organs.<sup>2</sup>

<sup>1</sup> *Vide* Chiari: *Zeitschrift f. Heilk.*, 1885, vol. vi. p. 81; and Breisky, in Grandin's *Cyclop. Obst. and Gyn.*, x. 323, 1887, rearranged from his *Krankheiten der Vagina*, Stuttgart, 1879, and his monograph in *Billroth's Handbuch der Frauenkrankheiten*, Band iii., 1886.

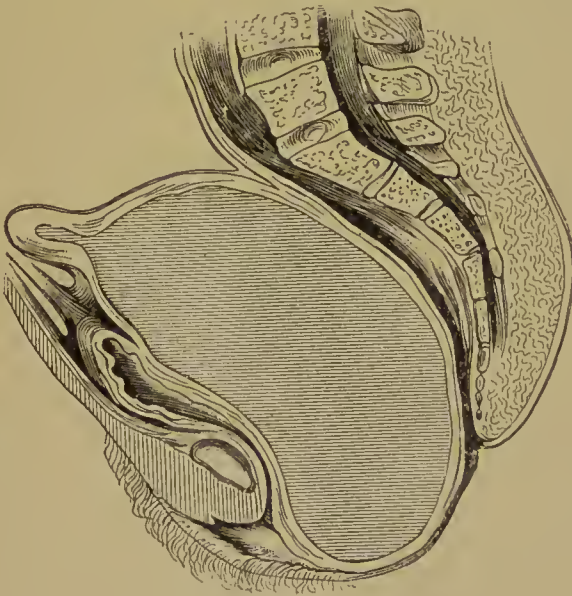
<sup>2</sup> Leukart (*Med. Zeitung*, München, 1852, vol. i. part 1, p. 1) and Thiersch (*ibid.*, vol. i. part 2, p. 69) originally demonstrated this development in the mammalian embryo, and all subsequent writers have accepted their conclusions as applied to the human fœtus (*vide* Breisky: *Cyclop. Obst. and Gyn.*, x. 211).

ATRESIA ( $\alpha$ , privative, and  $\tau\rho\omicron\gamma\sigma\iota\varsigma$ , a perforation) of the vagina signifies occlusion of that canal; it varies from a thin fibrous diaphragm to complete obliteration of the vagina; it may occur at any point of the vagina, but is most commonly found in its lower third. Most systematic authors distinguish its varieties as atresia hymenalis, atresia vaginalis, atresia cervicis.

The normal anatomy of the hymen has already been fully described (Vol. I. pp. 117, 118).

I. ATRESIA OF THE HYMEN is caused by inflammatory adhesion of the folds of this membrane after their formation during foetal life, and may be said to be always congenital. In common with other forms of congenital atresia, it excites no symptom or suspicion of its existence until puberty, when the non-appearance of the menses leads to its detection; then an examination shows the hymen to be a continuous membrane, impervious, thick, and almost cartilaginous<sup>1</sup> in consistency. As menstrual blood gradually accumulates in the pelvis a tense and bulging appearance of the hymen is presented. By this time

FIG. 3.



Hymenal Atresia (Breisky).

the vagina itself is full, and has formed a distended sac which nearly fills the pelvis. The uterus as yet may, however, be unaffected, as it only begins to fill and distend after the vagina has reached its utmost limit. This capacity varies in every case, and rupture of the thinnest part of the vaginal wall or of the cervix may occur in the process.

<sup>1</sup> Vide Hart and Barbour: *Man. of Gyn.*, 3d ed., p. 484, for the best account of this subject.

When in this condition hæmatosalpinx also occurs. Schroeder thinks the latter is generally due to a hemorrhage from the lining membrane of the tube itself, and not to simple reflux from the uterus. He has more than once removed a hæmatoma of the tubes under these circumstances where the uterine end of the tube was undilated or quite closed. Finally, the retained blood may pour out through the fimbriated extremity of the tube, causing pelvic hæmatoecle or peritonitis, or both.

The SYMPTOMS have been indicated in the foregoing statement. Menstruation is completely suppressed, although the menses may regularly recur, and the patient suffers from constant discomfort due to pelvic pressure, with occasional bearing-down pain. Micturition and defæcation may be interfered with. These symptoms should always lead to a digital examination, when the hymen will be found closed and bulging, as above stated, while the finger in the rectum shows the vaginal space to be occupied by a tense, elastic, fluctuating tumor.

The PROGNOSIS of simple hymenal atresia with proper treatment is always favorable, unless symptoms of intrapelvic hemorrhage have already occurred. But the imperative necessity for surgical interference must be impressed upon the patient and her friends.

The TREATMENT consists in puncturing the hymen with a bistoury or trocar, or by galvano-caustic knife, as recommended by A. R. Simpson, and slowly evacuating the imprisoned blood.<sup>1</sup> Counter-pressure upon the abdomen must be avoided, for it is thought important that the womb should empty itself slowly to avoid the risk of tearing loose such adhesions as may have formed between the Fallopian tubes and adjacent tissues by the rapid descent of the contracting uterus.

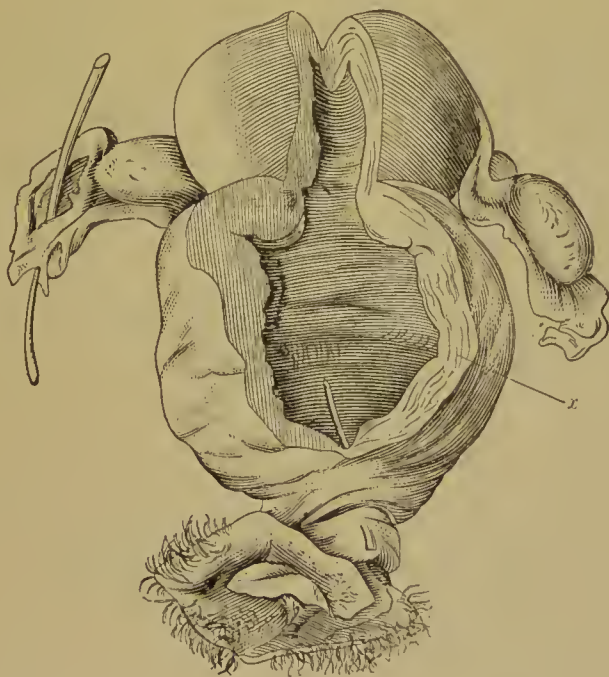
After this drainage is completed the hymen is to be completely divided by crucial incision or entirely dissected out, which may be effected at a second sitting if preferred; the vagina and uterine cavity should be gently irrigated and thoroughly washed out with warm carbolized water, and a tampon of lint or cotton soaked in carbolized oil maintained in the vulva for a few days, although changed daily. The patient must remain in bed until all danger of pelvic complications has subsided, usually about a week.

II. VAGINAL ATRESIA proper may be either complete or incomplete, and either congenital or acquired. The most common form is the incomplete variety, in which the obstruction exists in the middle or in the lower third of the vagina. Here the canal is found obliterated by a dense fibrous band, of which more than one are occasionally found, or a thick annular constriction occurs in its stead. Upon a basis of connective tissue this consists of muscular fibres covered with mucous membrane like the vaginal wall, with which it is continuous. It simulates a shallow cul-de-sac, but from this it may always be dis-

<sup>1</sup> Emmet advises free and rapid incision, and has met with uniform success.

tinguished by rectal examination, which reveals a pouch above it, and beyond this the cervix. In proportion to its thickness or extent this approximates the condition of complete atresia or entire obliteration of the vagina. In the latter condition imperfect development of the uterus is apt to be associated with it. When the obstruction is situated very low, just above the hymen, the latter is often spread out like a fringe upon the protruding mass, but there is no less bulging into the vulvar orifice than in hymenal atresia.

FIG. 4.



Atresia Vaginæ, seen from behind. Thickness of obstruction (through which probe is passed), 3-4 mm.; of vaginal wall below atresia, 2-3 mm.; above it (at *x*), 6 mm. Dilatation of the body of the uterus is small compared with the common cavity formed by cervix and upper portion of vagina. Left Fallopian tube markedly dilated, with no distinct flexion in it, and changed at its free end into a thin-walled blood-sac which had burst. Right tube undilated (Breisky).

The SYMPTOMS in such cases are practically the same as those that characterize atresia of the hymen, but the physical signs differ in one important point. Rectal touch, which is our sheet-anchor in differentiating all forms of atresia, indicates the vaginal tumor when the obstruction is low, or, in its place, the cord-like induration which occurs when the vagina is entirely absent. The latter may coexist with a perceptible but rudimentary uterus, which is a valuable guide toward operative interference.

The PROGNOSIS is always more serious in proportion as the atresia tends to complete obliteration of the canal, and to the degree of ute-



rine distension caused by retained blood; if the latter be considerable, it is always grave.

In hymenal atresia it is generally favorable, as we have already seen; in acquired atresia of the vagina proper it is often equally so.

In congenital cases the density of the tissue between rectum and urethra, and the possibility of dissecting a channel through it which shall serve as a vagina, will determine the prognosis. This difficulty, and the danger to the patient from rupture of the uterus or Fallopian tubes, and remotely from septic infection, should always be stated to the patient's family.

TREATMENT.—From surgery alone can we hope for any relief in atresia of the vagina, for the only treatment consists in the formation of a new canal through which the uterine contents can escape. Where this can be effected by removing simply a membranous band or a diaphragm of tissue, however thick, which occludes a partially-formed vagina, the task is comparatively easy. I have now under occasional observation a patient, twenty years of age, who more than a year ago entered my service in the Woman's Hospital with this form of incomplete atresia of the vagina. Menstruation, since its inception, had been prolonged, very painful, and attended by a dribbling flow, and increasing discomfort convinced her mother that she had some uterine disease. Rectal examination revealed a well-developed uterus and uterine appendages, while more than an inch below the cervix the vagina terminated in a cul-de-sac with a minute central aperture, through which the finest probe could scarcely be passed. When this was enlarged by circular incisions, the atresic diaphragm was found to be nearly half an inch thick and very vascular and elastic. The vaginal walls above this were quite smooth and normal. Deep incisions extending at short intervals to the overstretched vaginal wall, with subsequent dilatation, proving ineffectual, the patient was again etherized after a month's interval and the entire obstructing mass dissected out; and after applying a few catgut ligatures an aseptic tampon was applied and the extensive surface that had been denuded was left to heal by granulation. This process was slow, from the necessity of constantly maintaining effective dilatation, but by degrees it resulted in obtaining a perfectly formed vagina. In the rather large class of cases of which this is an example it may be laid down as a rule that it is always better to dissect out the atresic band at once, great care being taken not to encroach too closely upon the bladder or rectum.

If two or more obstructions of this kind be found, turning the vagina into a succession of pouches, the rule in operating will be exactly the same. When the diaphragm is completely impervious, imprisoning the retained menses, it may first be punctured by an exploring needle or a hypodermic syringe be used to assure us of the contents of the



sac; after which a crucial incision should be made, the sac exhausted and washed out with carbolized water, and the atresic membrane then or afterward dissected out as before. Whether atresias of this class be traumatic or congenital, their treatment is identical. Many interesting cases which illustrate these several varieties of atresia will be found narrated in detail in the important monograph of Breisky<sup>1</sup> to which reference has already been made.

FIG. 5



Case of Double Atresia. The lower affects the hymen, and was acquired; above this was a cavity one inch long which contained purulent debris: the upper obstruction was one inch thick and was congenital; above it is the dilated uterus and cervix. The Fallopian tubes contain blood-sacs with small rents in their walls (Breisky, case reported by Steiner).

Analogous cases of traumatic origin, or due to puerperal ulceration or dipltheritic or erysipelatos sloughing of the vagina, have been recorded by Bourgeois, A. Martin, Renonard, L. Mayer, Hennig, Nélaton, Trask,<sup>2</sup> Lombard,<sup>3</sup> Mattheyssen,<sup>4</sup> Levy,<sup>5</sup> and Boivin and Dugés. In Dieffenbach's works<sup>6</sup> will be found a full account of his observations and studies, to which surgeons of the present day are so much indebted; and, finally, in the learned monograph of Dr. A. Puech, entitled "Complex Atresias of the Female Genital Passages,"<sup>7</sup> a mine

<sup>1</sup> Grandin's *Cyclop. of Obst. and Gyn.*, x. pp. 231 *et seq.*

<sup>2</sup> *Am. Journ. Med. Sci.*, July, 1868.

<sup>4</sup> *Ann. de Méd. Belg.*, Aug., 1835.

<sup>6</sup> *Oper. Chirurgie*, i. 660 *et seq.*

<sup>3</sup> *Gaz. méd. de Paris*, i. 831.

<sup>5</sup> *Bibl. für Læger*, 1860, p. 39.

<sup>7</sup> *Ann. de Gynécologie*, Paris, 1875.

of information exists of which most subsequent writers have liberally availed themselves. In this country, besides the many observations of single cases in journalistic literature, American gynecologists are especially indebted to an exhaustive article by Prof. I. E. Taylor on "Atresia of the Vagina" in the *Trans. Amer. Gyn. Society* for 1879, and to the classical chapters on this subject by Thomas<sup>1</sup> and Emmet<sup>2</sup> in their respective works. The latter tabulates twenty-two cases of various forms of atresia occurring in his own practice—in itself a remarkable experience—and analyzes many of these in a most instructive manner. Dr. Chadwick of Boston has also published a series of valuable cases of atresia and stenosis of the vagina.<sup>3</sup>

### COMPLETE OBLITERATION OR ABSENCE OF THE VAGINA.

Here an entirely different plan of operation must be adopted. When complete closure occurs, the line of the canal will be indicated by a tense fibrous cord more or less distinctly perceptible from the rectum; when entirely absent no guide of any kind exists. In such cases arrested development of the uterus and ovaries, or their entire absence, usually coexists, but this is not invariably the case. Their presence is commonly held to be the justification for attempting to make a new vagina. When no trace of these organs can be found the general consensus of surgeons has discountenanced the operation. When rudimentary—even if a trace of uterus can be found—Dr. Emmet holds that the attempt should be made, and cites cases in which "nature had evidently delayed the development of puberty in consequence of an occlusion," and where the uterus was subsequently developed after previous failure to discover its presence.<sup>4</sup> Without attempting to criticise the objections made to this by Puech,<sup>5</sup> Gross, Ashhurst,<sup>6</sup> Ronbeaud,<sup>7</sup> and others, I think we may safely follow the rule laid down by Thomas, who says: "(a) if menstrual blood be imprisoned; (b) if a uterus can be distinctly discovered and the patient be suffering from absence of menstruation; (c) if the necessity for sexual intercourse be imperative."<sup>8</sup> The operation in such cases is as follows:

After emptying the bladder and thoroughly evacuating the rectum, the patient is anesthetized and placed in the lithotomy position. A curved steel sound is passed into the bladder, and is held by an assistant with the point upward. A second assistant aids the first in retracting the labia, which are usually well developed, and manages the sponges. The surgeon makes a superficial incision, either vertical

<sup>1</sup> *Diseases of Women*, 1880, p. 220.

<sup>2</sup> *Prin. and Pract. of Gynecology*, 1884, p. 188.

<sup>3</sup> *Boston Med. and Surg. Journal*, June, 1886.

<sup>4</sup> *Op. cit.*, p. 189.

<sup>5</sup> *Loc. cit.*

<sup>6</sup> *Prin. and Pract. of Surgery*, 1871, p. 943.

<sup>7</sup> *Traité de l'Impuissance et de la Stérilité*, p. 43.

<sup>8</sup> *Op. cit.*, p. 227.

(Emmet) or semilunar with concavity upward (De Sinéty), midway between the urethra and the anus. Then, introducing his left fore finger into the rectum, the dissection is cautiously continued with knife or scissors for a short distance ; but as soon as practicable the right fore finger is substituted, and with this the tissues are cautiously pressed and torn apart in the direction occupied by a normal vagina. While this line should be the aim of the operator, too close approximation to the sound in the bladder or the rectal finger must be carefully avoided. We owe to Amussat,<sup>1</sup> who followed the lead of Dupuytren,<sup>2</sup> this comparatively safe and facile method of forming the new canal ; but, unlike him, we try to complete the entire operation at one sitting, as urgently advised by Emmet. Repetitions of the procedure in small sections expose the patient to needless discomfort and risk of septicæmia. Whenever fibres or bands of tissue are encountered too dense for the finger, they are cautiously snipped with blunt-pointed scissors or divided by the knife-point. In this manner, constantly bearing in mind his rectal and vesical guides, the operator gradually reaches the cervix or the blood-sac (if either exists), and punctures this with an exploring needle or trocar. In retention cases, before this is done, careful palpation is employed to ascertain, if possible, the region of the cervix, which can sometimes be felt as a soft depressible round spot in the tumor-wall. To effect the opening Breisky<sup>3</sup> uses an ingenious lancet-shaped knife concealed in a canula ; the latter is pressed against the selected spot, the canula drawn back, the knife pushed on into the tumor, and the puncture enlarged by bilateral incision. Then the knife is withdrawn, while the canula is pushed on into the opening and held there, and a so-called "forceps canula" is passed over it. This exactly fits the first tube, and consists of "a canula split into two halves, to which a strong double-curved dilatation forceps has been added." With this the opening is thoroughly stretched, and, while the forceps is held open by a catch, the jaws are opened with as much force as may be needed. This permits the retained blood to escape at the surgeon's option, and when that is effected a silver tube is slipped through the jaws of the forceps canula and retained for purposes of drainage and antiseptic injections. In this manner dilatation is effected at one sitting, and a modified cervical canal permanently secured. The silver drainage-tube—for which any effective form of catheter could be substituted—is of course left *in situ*.

Breisky reports seven cases of broad atresia or obliteration of the vagina operated on in this manner, and the method commends itself as the best within our reach ; but it must never be forgotten that no two of these cases are alike, and that he will best succeed who is constantly

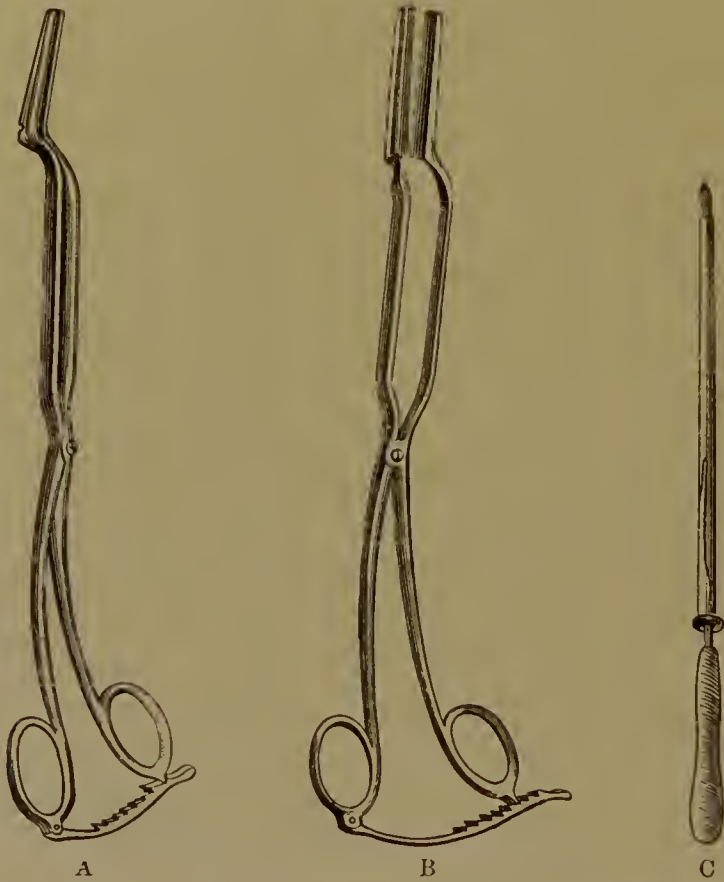
<sup>1</sup> *Gazette méd.*, Dec. 12, 1835.

<sup>2</sup> *Vide Courty: Mal. de l'Utérus*, 1866, p. 381.

<sup>3</sup> *Loc. cit.*, pp. 249-251.

prepared to modify his procedure as necessity demands. Should embarrassment occur as to the location of the cervix, as the surgeon thinks he has reached it or may be going too far, careful conjoined palpation between the rectum and the abdominal surface will usually determine its position. When the uterus or blood-sac has been emptied, suppos-

FIG. 6.



Forceps Canula : A, closed ; B, open ; C, Trocar Knife (Breisky).

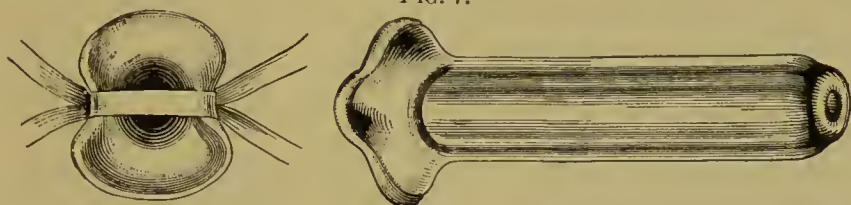
ing retention to exist, careful but thorough washing out of the cavity must be effected ; for this purpose weak solutions of carbolic acid—2 to 5 per cent.—or of listerine, or of thymol, or of iodine, should be preferred to the mercuric bichloride, which is never quite devoid of danger ; and the injection should be used with extreme gentleness, as the Fallopian tubes are often patulous.

In the after-treatment the patient is to be kept in bed for a week or ten days, and the vagina kept distended by a Sims glass vaginal plug. Instead of this, a temporary aseptic tampon or strips of lint soaked in carbolized oil may be used for the first twenty-four hours, but they have no practical advantage. The Sims vaginal plug as generally



made and used in New York is very defective: it should be of thick glass, carefully annealed to prevent the possibility of fracture, always perforated at the end to permit drainage, with the edge of the perforation well rounded, and fenestrated or indented at the rim to secure its retention by tapes. The vulvar end must be grooved to correspond

FIG. 7.



Perforated Glass Plug to be used after Operation for Atresia Vaginæ. The left-hand figure shows the external end of the tube with the tapes attached (Hart and Barbour).

with the urethra. The plugs should be of regularly graduated sizes, long enough to project half an inch from the vulva without forcibly distending the vaginal cul-de-sac, and thick enough to thoroughly fill the new canal and slightly to stretch it. The plug must at first be worn daily for as long a time as the patient can tolerate its presence, even if a small amount of morphia or some nerve-sedative be necessary to aid her in this. After cicatrization is effected it should be employed only at night, a slightly thicker dilator being occasionally tried to make sure that contraction of the canal is not occurring, for this is very insidious. After a few weeks the dilator may be used every second day, and so at gradually increasing intervals; but for one or two years such cases should be kept under occasional observation to make sure that recontraction does not occur. Before and after using the plug a warm antiseptic vaginal douche should be taken. Breisky objects to permitting the patient to use the dilator herself; but the above rule is that uniformly followed in this country, nor have I ever heard of a case where it was supposed to have engendered a tendency to self-abuse.

Stenoses of the vagina, which are always minor degrees of atresia, whether congenital or acquired, are so identical in their pathogeny and treatment with atresias, that a separate discussion of them is superfluous.

### CICATRICES OR CICATRICIAL BANDS.

This malcondition, which is rarely described or even alluded to in systematic works on gynecology, is of much interest to the practitioner, both from its frequency and the difficulty of treating it. In the first volume of the *Trans. of the American Gynecological Society* will be found an important paper upon it by Prof. Skene; in *Pepper's System of Practical Medicine* is a short and well-written notice of it by Dr.



Jenks (vol. i. p. 380); and scattered through French and German journals will be found many brief references of similar character. Vaginal cicatrices are usually caused by slight ruptures of the vagina during labor or the sloughing that follows parturition, by traumata of the walls that heal by granulation, and by the injudicious use of caustics. Much of this is preventible. Thus, when a caustic—such as nitric acid or the solid nitrate of silver—is employed, the utmost care in limiting its area and in preventing its deep action below the epithelial layer of the mucous membrane should be exercised. If rents or lacerations in the vaginal surface after parturition can be detected, they should, when practicable, be closed by catgut suture.

When surgical or accidental traumata heal by granulation instead of by first intention, the granulations should be so treated as to prevent their degenerating into cicatricial tissue.

But when all this is done many cases will remain in which cicatrices will occur in spite of our best efforts at prevention.

When once formed, vaginal cicatrices are tense, inelastic bands, often prominent above the surface, with deep sulci between them, frequently tender from compression of the nerve-filaments they contain, paler in color than the adjacent mucous membrane, and prolific sources of reflex irritation to all the pelvic organs. They may be so broad as nearly to occlude the vaginal canal, as in some of the traumatic atresias previously noted, or so narrow as to constitute sharp projecting filaments only; so near the vulva as to prevent coition, or extending like radii of a circle from the cervix uteri to the edges of the vaginal cul-de-sac, and here constituting an insuperable barrier to the use of pessaries and maintaining uterine displacements; when distended or pressed with the finger they are often intensely hyperæsthetic, commonly only tender. In a small percentage of cases they are the direct and only causes of vaginismus, and sometimes induce reflex irritation of the bladder or rectum.

The tenderness, Skene thinks, is most marked in scars “at or near the introitus vaginæ;” but I have seen intense discomfort, both local and reflex, caused by cicatricial bands in the posterior fornix.

Their TREATMENT, to be effective, must be by either discission or excision. I have never seen any benefit accrue from pressure or dilatation. When the cicatrix is tense and superficial, especially if it be movable on the subjacent tissue, it should be completely excised with scissors and the healthy mucous membrane united over its site with catgut or silver sutures. If immovable, thicker, or more deeply seated in the vaginal wall, it should be nicked or divided by knife or scissors at a number of points, and at one or more a portion of it removed if possible. After this, in each case, the vagina must be kept as fully distended as possible by a Sims glass plug or dilator. This is essential.

or recontraction will probably occur in the process of healing. When the dilator is introduced and removed a warm antiseptic douche should be employed. The dilator must be worn for several hours each day until union is complete, and occasionally thereafter for two or three months. Dr. Skene recommends in its stead, what I have never employed—viz. slippery-elm bark made into a roll of proper length and thickness and beaten until it is soft. This, dipped in carbolized warm water, is introduced as a tampon, when its very slow expansion causes gradual and painless distension of the cœatrix and the whole vagina. This plan merits a trial when the plug cannot easily be borne.

### SEPTATE VAGINA OR DOUBLE VAGINA.

This deformity occurs when the vagina is divided by a longitudinal septum, and is another result of arrest of development. Its immediate cause is the non-absorption of the intervening walls between the ducts of Müller, while their lower ends have coalesced to form the introitus vaginæ. It is commonly said to be associated with a double uterus, but this is by no means always the case. The septum consists of tissue exactly like that of the vaginal walls, and is usually about one-eighth of an inch thick; it extends either from the vulva to the os uteri or from any variable part of that distance.

Generally, the two canals are found side by side, but not precisely parallel with each other; much more rarely they are situated anteriorly and posteriorly, being divided by a transverse septum.<sup>1</sup>

In a few exceptional cases one vagina is imperforate, forming a blind pouch which may fill with blood from the uterus, with which it communicates, or undergo suppurative inflammation and form an abscess.<sup>2</sup>

Except in the last-named condition duplicity of the vagina causes little or no inconvenience. It is commonly discovered by accident, often during parturition: usually only one vagina is used in coition. Where dyspareunia or other difficulty from the intervening septum causes the patient to seek medical advice, division or entire removal of the septum is the only treatment that will afford relief. This can be done with bistoury or scissors, but much better (as it is often very vascular) by the thermo-cautery knife raised to a bright-red heat. The patient is anesthetized and placed in the left semi-prone position; both vaginæ are retracted by Dawson's modification of Sims' speculum with split blade. The septum, now rendered tense, can easily be divided by the cautery knife, an ivory paper-cutter being used if desired for counter-pressure in the opposite canal. Antiseptic dressings follow.

<sup>1</sup> Dempsey's case in *Dublin Journ. Med. Sci.*, vol. lxvi.

<sup>2</sup> Kleinwächter: *Zeitsch. für Geb. u. Gyn.*, xi. 254.

## VAGINISMUS.

By vaginismus is meant a condition of reflex spasm or painful involuntary contraction of the sphincter vaginae muscles. We owe the name and most of our clinical knowledge of it to Dr. Marion Sims;<sup>1</sup> its etiology has been studied and described by Hildebrandt,<sup>2</sup> Matthews Duncan,<sup>3</sup> Henrichsen,<sup>4</sup> Emmet, and Thomas. An excellent summary of the subject will be found in Hart and Barbour's *Manual of Gynecology*.<sup>5</sup> The researches of these authors show that vaginismus may be caused by urethral caruncles, by fissures around the vaginal orifice or within the anus, inflammation of the hymen or of its remains after rupture, minute ulcerated spots at the fourchette or in the fossa navicularis, and, finally, in some exceptionally hyperæsthetic women, without any perceptible local cause. Sometimes, but very rarely, it is reflex, as from cellulitis, ovaritis, or prolapse of a tender ovary. The conditions leading to its development, except in the case of anal fissure, may exist for years before giving evidence of its existence, but a vaginal examination or attempts at coition at once make it manifest. Hence its main symptoms are dyspareunia and sterility.

A vaginal examination causes immediate and persistent spasm of the muscles, with intense pain. The expression of the face is often careworn and distressed.

The PROGNOSIS of vaginismus is favorable; indeed, when we consider the intense discomfort and unhappiness it induces and the simplicity of its treatment, it is peculiarly so.

TREATMENT.—Dr. Sims advises a superficial or deep incision through the sphincter vaginae muscles in this manner: The patient is anæsthetized and placed in the lithotomy position; the vaginal orifice is stretched moderately by two fingers introduced into the vagina; a bilateral incision is then made with a bistoury through the mucous membrane into the bulbo-cavernosus muscle on either side, extending “for  $1\frac{1}{2}$  or 2 inches from a point half an inch above the ostium vaginae to the raphé of the perineum.” To be efficient, this should pass deeply into the substance of the muscle, and often causes pretty copious hemorrhage. The stretching is now repeated so as thoroughly to paralyze the muscles for a time. The vagina is tamponed with lint—and this must be done very thoroughly or hemorrhage will recur—a firm compress and T-bandage are applied to prevent disturbance of the tampon, and subsequent pain allayed by small quantities of morphia. In twenty-four or forty-eight hours the tampon is removed and a glass dilator substituted. In a week the patient is out of bed, the dilator meantime having been removed daily and warm antiseptic injections

<sup>1</sup> *Amer. Med. Times*, 1862.

<sup>3</sup> *Dis. of Women*, 1883, p. 142.

<sup>5</sup> Ed. 1886, p. 501.

<sup>2</sup> *Archiv für Gyn.*, iii. 221.

<sup>4</sup> *Archiv f. Gyn.*, xxiii. 59.

used; for one or two months longer the dilator must be worn at night and sexual intercourse interdicted. Various modifications of this plan have been practised with success during the twenty years which have elapsed since Dr. Sims proposed it.

Thus it has been advised to overstretch the muscles at the ostium vaginae only without subsequent incision. This, of course, is based upon Récamier's operation for anal fissure, and may be done either by passing two fingers of each hand (as does Hegar) or the thumbs (as advised by Tilt) into the vagina, and then forcibly separating them until some fibres of the sphincter muscle are felt to give way. This operation is bloodless, but can never be accounted so efficient as that of Dr. Sims, and should be reserved for slight cases.

If there be fissures of the anus or within the vaginal outlet, their base should be incised with scalpel or lightly touched with the thermo-cautery. If the morbid irritability should seem to be confined to the hymen, this should be carefully dissected out; an irritable urethral caruncle or inflamed carunculæ myrtiformes must also be completely removed and their base carefully cauterized. Irritable ulcers are to be similarly cauterized, and subsequently dressed with iodoform or iodoform ointment. But in each of these cases the cure will be incomplete without the subsequent use of the dilator, and often this cannot be borne until forcible dilatation is practised. It may therefore be said that forcible dilatation, with or without Sims' incision, is practically essential for the cure of all cases of true vaginismus. In the after-treatment constitutional measures must never be neglected in delicate subjects. Fresh air, out-of-door exercise, tonics when indicated, and especially change of scene with temporary absence from home, which is most likely to secure complete sexual rest, should be enforced upon the patient; and a cure may confidently be predicted.<sup>1</sup>

#### DISPLACEMENTS OF THE VAGINAL WALLS

consist mainly of cystocele, rectocele, and complete or incomplete prolapse of the vagina, which is always accompanied by prolapse of the uterus. Although commonly due to the subinvolution that follows parturition, this is not invariably the case. Prochownik<sup>2</sup> reports the case of a virgin, aged twenty, in whom a combination of very hard work with imperfect nutrition caused a complete prolapse of the posterior wall; but here a congenital deficiency of the perineum contributed to the lesion. Billroth<sup>3</sup> records another of similar kind with prolapsus uteri and vesical ectopia.

And, through the kindness of Dr. Boldt of New York, I have

<sup>1</sup> See Vol. I. p. 511.

<sup>2</sup> *Deutsch. med. Woch.*, 1884, No. 36.

<sup>3</sup> *Chirurg. Klinik.*, Berlin, 1879.



lately witnessed another of the same kind, with both cystocele and rectocele, for which Hegar's operation was done by Dr. A. Martin of Berlin. But these are rare and simply curious exceptions: the rule remains that in the vast majority of cases the cause of vaginal displacements is subinvolution of the vaginal walls after the distension that occurs in parturition.

In the first volume of this work (p. 667 *et seq.*) Prof. Reamy has so fully described the etiology and pathogeny of this condition that a repetition here is useless. But a brief statement of the means of curing these distressing malconditions will not be out of place. In surgery alone can these be found, for no pessary or combination of pessaries that has ever been devised will sustain the prolapsed vaginal walls when the uterus also is prolapsed. In deciding the means to be adopted the exact nature of the existing lesion must be carefully ascertained. To effect this the patient should be examined both in the standing and supine position; the semi-prone position of Sims is useless. The patient when supine, with the knees flexed at right angles or drawn up in the lithotomy position, should be made to hold her breath and strain or "bear down" as forcibly as possible. In a moment the vaginal walls will roll out of the introitus to the full extent permitted by the loosening or redundancy of these tissues, and the cervix uteri will descend and perhaps become procident. By the reverse action of the muscles the vaginal walls can be partially drawn in, but not completely. We can now judge whether the anterior or the posterior wall be the more redundant and most in need of repair: when cystocele exists some laceration of the perineum will almost always be found, but the most complete rectocele is sometimes seen without a corresponding cystocele. If pressure by the finger be made upon either of the tumorous masses thus formed, it will be found soft, elastic, yielding, and by steady pressure easily returnable to the vagina. Should any doubt be felt as to its nature, a rectal examination with the finger or an exploration of the bladder with a well-curved sound will at once remove uncertainty. This, indeed, should never be omitted, for it affords us the only clear evidence obtainable of the thickness of the vesico-vaginal or recto-vaginal septum, which is most important when we come to operate.

Besides the symptoms of vaginal prolapse that characterize this condition, the patient often suffers from all the inconvenience of partial retention of urine, which gravitates into the pouch forming the cystocele, and from difficulty in defecation due to impairment of expulsive power in the rectal wall. The operations devised for its relief are grouped under the name of elytrorrhaphy or colporrhaphy, and subdivided into anterior and posterior colporrhaphy as the procedure is applied to the anterior or posterior wall of the vagina.



An excellent résumé of the improvements that led to the operation of colporrhaphy, as now employed, is given by Thomas,<sup>1</sup> Emmet,<sup>2</sup> and Parvin,<sup>3</sup> whose remarks may be consulted with advantage by the student.

**ANTERIOR COLPORRHAPHY.**—Among many variations of this operation—of which the aim is so to narrow the anterior wall of the vagina as to give firm support to the bladder and uterus—three have commended themselves to the profession in this country and Europe, and will here be described.

These are Sims' as modified by Emmet, Hegar's, and Le Fort's. The priority of performing the latter is claimed by Neugebauer of Cracow, but in this country it is universally known as Le Fort's. Besides these a simple and ingenious method of operation has been devised by Stoltz of Nancy, for which the reader may consult Dr. Mundé's *Minor Surgical Gynecology*,<sup>4</sup> where it is well described.

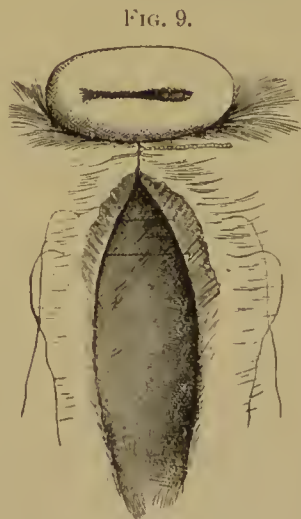
I. Sims' and Emmet's operation, which was matured twenty years ago, consists in denuding an irregular triangle of mucous membrane upon the anterior vaginal wall, which is mapped out in this way: The patient, anæsthetized, is first placed on the back. The uterus is thoroughly anteverted, and the cervix so held with a probang sponge while she is turned in the left semi-prone position. Sims' speculum is then introduced, and the mucous membrane is caught up by tenacula a half inch on either side of the cervix and a little behind it. If these can be approximated, the mucous membrane is snipped out to mark the upper angles of the triangle; these freshened surfaces should be at least half an inch square. Then a similar space of twice the size, just in front of the cervix, is to be denuded in like manner. A needle carry-

FIG. 8.



FIG. 8.—Emmet's Operation for Procidentia, as would be seen with the woman on the knees and chest (Emmet).

FIG. 9.—Folds formed after Twisting the First Suture (Emmet).



ing silver wire is now passed under these denuded spaces in such a way as to approximate them exactly by tightening and twisting the

<sup>1</sup> *Diseases of Women*, 1884, p. 176.

<sup>3</sup> *Internat. Encyc. Surgery*, vi. 740.

<sup>2</sup> *Op. cit.*, p. 356.

<sup>4</sup> Ed. 1885, p. 522.

wire. This puckers the anterior wall into a deep sulcus, the mucous membrane of which is denuded with scissors, until the vestibule is reached, in the form of an ellipse. When this space is carefully cleaned of any tags or remnants of mucous membrane which may have escaped the scissors, and washed antiseptically, the wound is closed with interrupted sutures of silver wire, the needle passing as deeply under the surface as the thickness of the septum will permit, and four or five sutures to the inch being inserted. These are successively twisted from above downward, cut short, and made to lie flat on the vaginal wall; and after again cleansing the vagina the parts are supported with an antiseptic pad or tampon. The patient is kept in bed, on side or back at option, for two weeks, during the first of which the bladder is emptied by the catheter. Then the sutures are removed, but unless cicatrization is firm the patient should still remain recumbent another ten days or fortnight, and must be cautioned against any effort at straining or lifting heavy weights for several weeks more.

The results thus obtained are generally, but not always, satisfactory.

II. Hegar's operation, as modified by Werth of Kiel and the late Prof. Schroeder of Berlin, aims at the same result in a different manner. The patient, anæsthetized, is placed on the back, with the thighs well retracted in the lithotomy position. I employ Clover's lithotomy crutch to sustain the thighs, and a submucous injection of cocaine solution (4 per cent.) if the patient objects to ether. With a tenaculum the mucous membrane of the vestibule just behind the urethra is caught up and kept on the stretch, and the extreme lateral margins of the anterior wall are similarly held with tenacula or locked forceps. Then with a bistoury or scalpel a triangular incision is made through the whole thickness of the mucous membrane, with a broad or rounded apex in the vestibule and the base a half inch in front of the cervix uteri, and the flap thus formed is carefully dissected off from the base upward. If the vesico-vaginal septum be thin, extreme care is needed in this dissection to avoid opening the bladder, an accident that has more than once happened. The fingers and the handle of the scalpel will accomplish much in this process, but the central line (consisting of the anterior column of the vagina) is so tenacious and muscular that either knife-blade or scissors is here a necessity.

When the flap is removed, the raw surface is carefully trimmed with scissors of any tags or strips of mucous membrane that may remain, and with a curved needle (not Hagedorn's, which here is apt to cut the tissues) a long suture of stout catgut is passed under the denuded apex and its end tied firmly. Then the edges of the wound are firmly approximated by the overlapping cobbler's stitch from above downward, an assistant keeping the catgut taut after each time the needle emerges. When the base of the triangle is reached, repeated stitches

must be taken through the whole thickness of the mucous membrane or the catgut may stretch or yield. If much tension is apprehended, a preliminary line of suture may be run deeply down through the centre of the wound, including a less amount of tissue, and the sides then approximated as before.

The distinctive features of Hegar's operation are the mode of removing the flap, the cobbler's stitch, and the animal suture, which is not touched or looked for until after cicatrization is supposed to be complete. Its advantage is the comparative rapidity with which the operation may be thoroughly performed, and in my hands it has yielded excellent results. The after-treatment is the same as for the Sims-Emmet operation.

III. Of the procedure devised by Leon le Fort, which was chiefly intended for general vaginal prolapse, the following description is condensed from Le Blond<sup>1</sup> and Sinéty:<sup>2</sup> The patient is placed on the back, with thighs flexed as by Hegar, and the uterus is drawn down and out of the vulva to its full extent. While so held by an assistant four incisions are made on the anterior vaginal wall as near as possible to the vulva, and a raw surface obtained six centimeters long by two wide; then, drawing the uterus upward and forward, a similar space is denuded upon the posterior wall of the vagina. Pushing back the uterus sufficiently to bring the upper edges of the two raw surfaces in contact, lateral sutures of silk or silver wire are now passed in such a manner as firmly to unite the anterior and posterior walls for the distance indicated. If silk or thread be employed, it is essential to cut the ends long, so as to avoid their being lost in the sulcus which results from the operation: well-annealed silver wire is equally manageable and preferable in every way. Thus, the uterus is, as it were, pocketed above a firm pad obtained by agglutinating the vaginal walls, and an artificial atresia vaginæ results. For obvious reasons this method is only applicable in advanced life or at least after menstruation has ceased.

It has been used extensively in France, and good results are reported from it. In this country it is comparatively rare.

POSTERIOR COLPORRAPHY AND PERINEORRAPHY.—As the posterior vaginal wall and perineum form the main support of the uterus, and as they are the tissues always most sure to suffer when the soft parts are damaged during parturition, it is natural that their laceration or other injury should always have excited the chief interest of both patient and surgeon. Accordingly, we find from the earliest times a much greater multiplicity of suggestions for their repair than have ever been made for cystocele. It is known that Ambroise Paré operated with success, but after his day failure was so frequent that the opera-

<sup>1</sup> *Traité élément. de Chir.-Gyn.*, p. 407 *et seq.*

<sup>2</sup> *Man. prat. de Gyn.*

tion was gradually abandoned until, fifty-five years ago, Roux again revived it successfully with the quill suture. After him, Baker Brown in London and Dieffenbach in Berlin did much to attract the attention of the profession to the subject, obtaining a fair success with the quill suture, as did Roux. Since then Sims and Emmet in this country, Langenbeck, Simon, Hegar, Schroeder, and Martin in Germany, and many minor authorities in France and England, have labored to improve our methods of procedure, until it can now be said that secondary posterior colporrhaphy and perineorrhaphy have reached a stage closely bordering on perfection.

As a history of the various steps by which this has been attained is beyond the scope of a practical article like the present, only two methods of operating will be described—Emmet's and the Simon-Hegar operation, which I believe to be the most perfect in themselves and to give the best results.

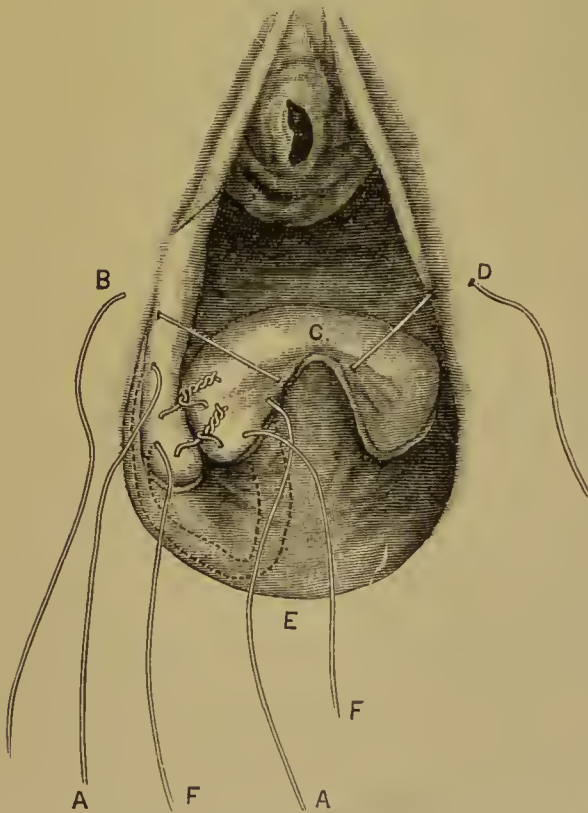
Emmet's method of performing posterior colporrhaphy is as follows: The patient, anæsthetized and supine, is drawn down to the edge of a narrow operating-table; the thighs are flexed upon the abdomen and retained by the application of "Clover's crutch." Flannel drawers and stockings should be worn. Two assistants are desirable besides the anæsthetizer, although the operation may be done with only one. For most of the sutures silver wire, well-carbolized silk, or carefully-prepared catgut of medium size may be used with equal success; but what is called the "crown suture" should never be of catgut, as the tension upon it will be too great.

For the detail of the operation I will quote Dr. Emmet's words: "The first step is to seize with a tenaculum the crest of the presenting rectocele or the posterior wall of the vagina at a point where it can be drawn forward without undue traction to near the entrance of the urethra, and the instrument is then to be placed in the hand of an assistant, which is to rest above on the pubes. Then the operator is to hook up with a tenaculum the lowest caruncle or vestige of the hymen" (on either side), "and then bring the three tenacula together. When this has been done, it can be seen at a glance what tissues are to be united together, as a crescentic ridge will be found just within the vagina, running across its axis, with each horn becoming gradually lost in the sulcus on each side. The vaginal canal will be found reduced in size, the perineum will have been apparently drawn up toward the arch of the pubes, and the tissues at the previously gaping outlet will have been rolled in until the vaginal entrance is no larger than that on any female who has not given birth to a child at full term. To be able to freshen the surfaces, the surgeon now hands a tenaculum, with which a caruncle has been caught up, to the assistant on the side where he wishes to begin, while the tenaculum in the centre of the posterior



vaginal wall is to be still held above in the median line. If slight traction be made with the outer tenaculum, two triangular-shaped folds at once are formed by the apex of each being drawn out with a tenaculum, the upper angle running into the vaginal sulcus on that side, and the other toward the skin which would form the outer portion of the fourchette if it were intact. These two surfaces are the ones to be denuded and united. The first suture is to be introduced in the angle at the sulcus and from thence forward. Fig. 10 represents both sides

FIG. 10.



Emmet's Inside Operation for Diminishing the Size of the Vaginal Outlet.

of the vagina denuded, and all the sutures on the right side have been introduced. Two of these near the angle have already been twisted, while two others (F and A) have not yet been secured, and the dotted lines indicate the direction in which they were introduced. The suture B C D is an important one, as it closes the whole line, but in the operation it is never introduced until the last, after all the others have been gathered on both sides, and it is also the last one to be twisted. Its course from the labium on one side over to the crest of the rectocele, or posterior wall of the vagina, and to the opposite labium, is such that, when it is tightened, the parts are all brought up together. It is employed,



as we shall see hereafter, for this purpose in all operations for closing a lacerated perineum where the support is to be gained from the posterior wall of the vagina. After all the vaginal sutures have been twisted a shallow line in the direction C E will remain open. This has been formed by bringing together the surfaces between B E on one side and D E on the other. These edges should be united by sutures passed deep enough to include in the centre ones a portion of the posterior wall of the vagina. They can be secured by perforated shot, as shown in Fig. 11, with the ends of the wires cut off; and when the labia are allowed to close together the sutures will be generally hidden from view.

FIG. 11.



Appearance at Completion of Operation (Esmet).

should extend through the sphincter ani.

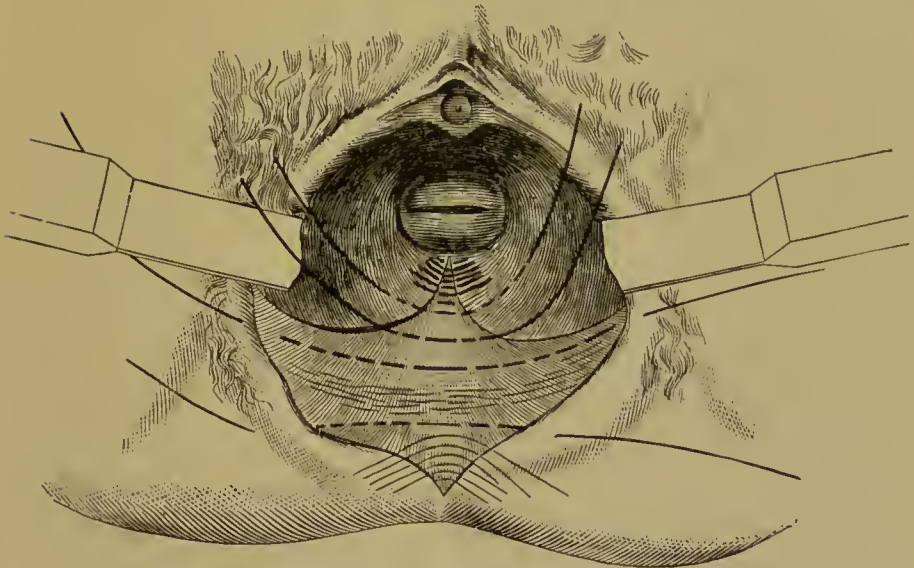
"There are two points in the operation which require some exercise of judgment, and success will be the greater with increased experience. The most common mistake would be committed by taking up too much of the posterior wall; and if this be done, failure may result from the sutures cutting out. It is equally important to be able to judge of the number of sutures which should be placed in the angle of the crescent. The rule should be to introduce just so many as are necessary to bring the outer angle of the fold formed by the denuded sutures to the vaginal level; and the crescentic line should always be made as small as possible to accomplish this. When I first began to perform the operation I had several instances where the patients suffered a great deal of discomfort afterward from the too great traction exerted. This difficulty was due to having denuded too wide a surface in the angles, so that a prominent fold could be felt in the vagina running off from each angle to the sides, which became the more tense as the line healed and retracted." Silver wire, waxed and carbolized silk, and well-prepared catgut may all be used as sutures, as previously stated.

The after-treatment is simple: rest in bed for two weeks, with hot vaginal injections, very gently given if there be much heat and tension in the vagina. The catheter is unnecessary.

II. *Hegar's Operation*.—This operation, devised by Hegar of Freiburg, somewhat altered by Werth of Kiel, Bischoff, Schroeder, and A. Martin of Berlin, and which is itself a modification of Simon's, is gen-

erally practised in Germany and to some extent in this country, and, like Emmet's, yields very good results. It aims at taking in more of the perineum than Emmet's, and can be understood better from the accompanying wood-cut than from any verbal description. The patient

FIG. 12.



Hegar's Denudation for Prolapsus, front view (Hegar and Kaltentbach).

is anaesthetized, and kept in the supine position with the thighs flexed for lithotomy. Here, as before, the "Clover's crutch" is a great additional convenience. The labia are retracted by two assistants, one of whom also draws upward a tenaculum inserted by the operator in the posterior wall at the apex of the space to be denuded. This must constantly be kept taut to steady the flexible mucous membrane, or the outlines of the intended space will be lost. The tenaculum is so apt to slip out that I prefer to pass through the point selected a needle carrying a loop of thread, through which the needle is then slipped, so as to knot it: steady traction is then easily made with the loop. An incision is now made with a small scalpel along the lines indicated in the diagram, and the entire thickness of the mucous membrane is dissected off within these limits as carefully and expeditiously as possible. This may be done with either scissors or scalpel: in Germany the knife is preferred. When this has been carefully trimmed and finished, two lines of sutures are inserted with as much accuracy as practicable—a short superficial row at the apex and base, and a deep row in the more central part of the space to be closed in. For the superficial sutures catgut answers as well: carbolized silk or silver wire is much safer for the deep sutures. This operation may be more rapidly done than Emmet's, and in my hands it has yielded very good results as long as

I have been able to follow my cases. As most of these have been done in hospital, the number remaining under my observation has been limited; in several of these the uterus has remained firmly supported for three or four years. Hegar reports a very large number of cases that remained well from four to ten years after operation, and in several of these a subsequent pregnancy and parturition had not caused a return of the disease.

#### RUPTURE OF THE VAGINA, AND HÆMATOMA.

The consideration of rupture of the vagina belongs rather to obstetrical than to gynecological literature; but, as it sometimes occurs from traumatic causes, a brief reference to it will here be made.

Besides the occasional ruptures met with in parturition, which occur either at the vault of the vagina in association with laceration of the cervix or at the outlet with rupture of the perineum, it may fall within the province of any practitioner to treat lacerated wounds entailing a complete rupture of the canal. Many such cases have been recorded, as by Fleury,<sup>1</sup> Rey, Colombat,<sup>2</sup> Grenser,<sup>3</sup> and Fehling.<sup>4</sup> The latter narrates the case of an elderly multipara, with long-standing prolapse of the vagina and uterus, quoted by Breisky: "One day, after going up to the fourth floor of her house with a pail of water, the prolapsed uterus became very greatly protruded, and she attempted to replace it forcibly with her hands. As the result a fatal rupture of the posterior vaginal walls occurred, with prolapse of the intestines."

In certain surgical operations or such operative procedures as the forcible reposition of an inverted uterus more or less complete rupture of the vagina may now and then occur. It is especially liable to happen in operations for stenosis, where the distended sac above the constriction has become very thin, and in the forcible extraction of uterine fibroids. The causation in the latter case is, of course, exactly similar to what occurs in parturition.

Apart from the suffering entailed, the dangers of such an injury are due to hemorrhage and sepsis: in parturient cases the latter is very grave indeed, but in traumatic lesions it should always be borne in mind.<sup>5</sup>

The PROGNOSIS will depend upon the rupture being partial (superficial) or complete, or "penetrating" as German authors term it. In the latter it is always serious.

The TREATMENT consists in arresting hemorrhage and repairing the rupture by sutures after carefully cleansing the parts. This can best

<sup>1</sup> *Ann. de Gynéc.*, viii. 457.

<sup>3</sup> *Gräfe u. Walther's Journ.*, vol. v. part 3.

<sup>5</sup> See Vol. I. p. 479.

<sup>2</sup> *Trait. des Mal. des Femmes*, ii. 424.

<sup>4</sup> *Arch. für Gyn.*, vi. 103.

be done by gentle irrigation, and unless the rupture be in the posterior wall a Sims speculum should be used, as giving much more working room.

As the sutures are by far the best hæmostatic, ligatures will rarely be needed; if used, they should be of catgut. Silver sutures are best, but any carbolized or aseptic sutures the surgeon prefers may be employed. A subsequent tampon is unnecessary. Aseptic irrigation will always be found useful and hasten recovery.

HÆMATOMA OF THE VAGINA is an exceedingly rare affection. In the Vienna clinic Wucher reports that in 6000 confinements Späth found only 4 cases; Winckel of Munich estimates that it occurs once in every 1600 cases; in Breisky's clinic at Prague only 1 case has occurred in 2126 births, while Bidder and Sutugin found only 1 case in 3285 confinements (Breisky). In this country and in England no tabular statements within my knowledge have been made of it, but there is no reason to think it more frequent. Most of the few records of it that exist make no distinction whatever from thrombus of the vulva, and the name "pudendal hæmatocele" has been employed to cover both conditions. This, however, is not unnatural, for the two lesions, although distinct in location, do not differ in their mode of origin. The predisposing causes are the greatly increased vascularity, hyperplasia, and relaxation of vaginal tissue that accompany pregnancy, for to this period and that of parturition the accident is practically limited. A varicose state of the blood-vessels may exist, but is not essential to its production. The exciting cause is sudden and forcible exertion which puts an undue strain on the vaginal walls. Thus, a violent fit of coughing has been known to cause it, and any act that entails sudden and violent abdominal pressure may lead to its production. In childbirth, however, traumata, either instrumental or accidental, commonly induce it. It is most frequent in primiparæ, and especially in such as present unusual relaxation of the muscles and fasciæ; thus, it occurs most often perhaps among the upper classes. Its etiology and mode of production are uncertain, as very few and indefinite investigations have been made upon this point; but it is probable that the blood effused is entirely venous, as the more elastic arteries escape pressure or a contusing force with much greater ease than the veins. The swelling also yields no systolic impulse nor any of the characteristics of an arterial growth or tumor. It is rarely or never visible like vulvar hæmatoma, and is recognizable only by the subjective symptoms and the touch. During childbirth, in spite of the fact that the contusing force of the fœtus (or the presenting part of the fœtus) is the direct cause of the hæmatoma, the latter rarely appears until the delivery is completely over. Why it should not occur before the pressure of the advancing child is removed is obvious, but not so its delay until after



the third stage is terminated. In the two (and only two) cases that have occurred in my practice this was the case, and other observers concur in this statement.

The SYMPTOMS will of course vary with the location and extent of the effusion. They are so well expressed by Breisky that I quote his description: "As a rule, there is sudden hypogastric pain, a feeling of bearing down, and, when the tumor is large and affects the posterior walls, painful attempts at defecation. Symptoms of acute anæmia, fainting, and collapse have been observed a number of times, especially when the hæmatoma formed while external hemorrhage was in progress. If, in addition to these symptoms, there be those of tension and separation of the walls of the retro-vaginal septum, with elevation and ante-flexion of the uterus and dragging upon the walls of the rectum, the trouble may become very great, and the pain far exceed that which attended the precedent delivery." Although this may seem an extreme statement, it exactly tallies with what occurred in my second case. In June, 1886, a delicate primipara was placed in my care by a medical friend who had lately had several cases of puerperal fever in his practice. Family reasons and her own frail health caused great anxiety to be felt for her approaching confinement. When this took place she was sedulously watched, but each stage of it was quite normal. Slight delay occurred in the second stage; but, although forceps were at hand, they were not at once applied, and before they were deemed necessary the child was expelled with no more than ordinary difficulty. A trifling rent in the cervix and slight laceration of the perineum occurred; the child was a finely-developed boy and had presented by the vertex. The third stage was entirely natural, the placenta coming away entire by Credé's method. Although the perineal tear was unimportant, I thought it wiser to repair it, in view of the general muscular relaxation of the patient; and, administering a little more chloroform, I brought the edges carefully together with two sutures of Chinese silk. Not until this second anæsthesia passed off did the symptoms of the ensuing hæmatoma appear. Then, with the complaint that "something else seemed to be coming down," the patient evinced signs of great distress, which rapidly increased until her suffering became insupportable. Thinking her hysterical, I tried in vain to pacify her, and soon had to give a large hypodermic injection of morphia; this also proving fruitless, I reluctantly cut out the perineal sutures, fancying the tension to be more than she could tolerate. This was equally ineffectual, and, in addition to her obvious suffering and declarations that the pain was worse than the previous labor-pains, the patient's increasing pallor and thready pulse seriously alarmed me. Once or twice she gasped for breath and seemed likely to sink into a state of collapse, but whether from hysterical excitement or some internal loss of blood I could not

possibly discover. The anxiety of the situation may be imagined, for to one who tries to work both faithfully and intelligently I suppose the most harassing of all feelings is that of ignorance of the cause of existing danger.

Up to this time the uterine had been, and continued, firmly contracted above the pubes, there had been little or no external hemorrhage, and a most careful exploration at the beginning of the pain had shown nothing perceptibly wrong with either uterus or vagina. Much puzzled, I now made a fresh examination, when, to my surprise, the whole posterior vaginal wall bulged forward so as almost to obliterate the canal; the cervix uteri was pushed upward and forward behind the arch of the pubes; and the cause of both suffering and collapse was obvious. No swelling or discoloration of the vulva existed; but, although arrested by the deep perineal fascia, enough blood had been effused into the recto-vaginal septum within the short time that had elapsed since my last examination to cause the suffering described and to jeopardize a dangerous collapse. When discovered the damage had been done, nor could it by any means known to me have been anticipated or averted. Happily, no more hemorrhage occurred, and the patient made a slow but complete recovery. Within forty-eight hours the vulva and much of the nates became discolored by the effused blood; this doubtless relieved the tension above, which at first was so great that, fearing a rupture of the distended vaginal wall and recurrent hemorrhage, I kept the patient under an assistant's constant supervision for several days and nights.

The **DIAGNOSIS** of vaginal hæmatoma should not be difficult. In addition to the foregoing symptoms, although nothing is visible externally, a digital examination readily detects the swelling. This is usually globular, smooth, compressible, not very tender, and if exposed with the speculum its bluish or purple color is highly significant of imprisoned blood. It may be either imperfectly pediculated or sessile; occasionally the thinned vaginal wall has given way and the oozing venous blood that escapes is characteristic. These appearances and the history of its sudden onset suffice to complete the diagnosis.

The **PROGNOSIS** is commonly favorable.

In its **TREATMENT** the main point will, of course, be to decide whether or not to open the tumor. As a general rule, it may be said this should not be done, for no means of compression that we can apply high in the vagina, whether by tampon or colpenyter, will surely suffice to prevent a recurrence of the hemorrhage.

Two conditions—and only two, that I know of—form the exception to this rule: viz. when suppuration in the cyst has occurred or threatens, and when the hæmatoma occurs in late pregnancy and forms a barrier to delivery. In the first of these septicæmia may result

from inaction; in the second the necessity is obvious. If this be done or if the sac have spontaneously ruptured, we should gently evacuate its contents and cleanse it thoroughly with warm antiseptic injections, and then pack it with iodoform gauze. After this a firm tampon with a T-bandage must be carefully applied. In ordinary cases antiseptic and astringent injections should be used daily, the vagina tamponed in the intervals, and the patient kept in the recumbent position.

### FOREIGN BODIES IN THE VAGINA.

Although this subject is treated in all works on general surgery, a brief allusion to it should be made here.

Foreign bodies of the most various and unexpected character have been removed from the vagina, where their detection was only caused by the inflammation they had begun to excite. As a rule, the patient denies all knowledge of their presence, and is apparently more surprised than the surgeon by their discovery. Thus, Mr. Hilton removed a flat bone netting-mesh ten inches long from the vagina of a young girl; it had to be divided before removal.<sup>1</sup> Mr. Birkitt<sup>2</sup> removed with forceps an ale-glass  $2\frac{1}{2}$  by 3 inches in size, and in another case a glass bottle. Many other cases are recorded where a hair-pin (Getchell),<sup>3</sup> spools (Breisky, Hoffman, Carter), broken glass from specula or syringes (Kurz, Day, Levis), pomade-pots (Schroeder, Dupuytren), sponges (Capuron, Meissner, Runnals), and long-forgotten or neglected pessaries, have been removed by surgical aid. In some of these instances extensive and long-standing inflammation, ulcerations, or abscess had been induced by the foreign body, and in more than one this led to a fatal result. Ascarides sometimes pass from the rectum into the vagina, especially in children, and excite the most troublesome vaginitis.

Of the detection of foreign bodies in the vagina nothing special need be said. This only becomes difficult when they have become so imbedded in the tissues or covered with granulations as to be difficult of recognition. Thus in one of the cases narrated by Breisky<sup>4</sup> a spool, introduced many years before, had ulcerated through the fornix vaginae and lay in a pus-cavity between the uterus and rectum. Only a rectal examination demonstrated its presence.

In their TREATMENT the general rules of surgery are to be followed, and, as far as possible, with antiseptic precautions.

Where the foreign body has become encrusted with granulations, or, as in the case of old pessaries, has sunk deeply into the vaginal wall,

<sup>1</sup> *Med.-Chirurg. Trans.*, xxxi. 315.

<sup>2</sup> *London Lancet*, 1856, ii. 451.

<sup>3</sup> *Philada. Med. Times*, 1873.

<sup>4</sup> Billroth: *Handbuch der Frauenkrankheit*, and *loc. cit.*, p. 365.

it is to be cut out with extreme care, and all approach to roughness in manipulation must be avoided. If broken glass be detected, it will be wise to follow the ingenious device of Levis, who cautiously filled the vagina with liquid plaster-of-Paris from a syringe, and, after it had securely set, removed the mass, which was now a complete cast of the vagina containing all the fragments of glass in it. If this be contemplated, it is well to give a preliminary injection of olive oil or melted vaseline, and to use the plaster after the vaginal walls are thus lubricated.

In all cases the use of antiseptic injections should follow the removal of the foreign body, and if there be much vaginitis the patient should remain recumbent until it has completely disappeared. If in spite of these precautions the vaginal wall be torn during the extraction, such injury must be treated on general principles.

### NEOPLASMS.

Like the uterus—although much less frequently from the less active vitality of its tissues—the vagina is the seat of new growths, with which some acquaintance is essential to the practitioner.

These are chiefly *fibromata*, *sarcoma*, *carcinoma*, *tuberculosis*, and *cysts*, which, in this order, will be severally described.

Cases of lipoma (Pelletan), partial hyperplasia (Kiwisch, Breisky), and diffuse papillomatous degeneration (Klob, Marsh, Müllerklein) of the vaginal walls have also been reported, but in the present state of our knowledge these are to be regarded as mere curiosities.

I. FIBROMA (fibro-myoma, fibroid tumor, myoma) OF THE VAGINAL WALLS is quite a rare formation. In 1882, Kleinwächter<sup>1</sup> collected 50 cases then found scattered in medical journals, to which he added 3 more, including 1 that occurred in his own practice; to these Breisky<sup>2</sup> makes 5 additions—2 from A. Martin, and 1 each from Hermann's, Caswell's, and his own experience. These 58 comprise all the reported cases I know of, although doubtless many have been found and treated without appearing in print. In 44 of these cases, where the location of the growth was accurately stated, it was found to spring from the anterior wall in 28, from the posterior in 11, and from the lateral wall in 5 cases. Generally, the fornix or upper third of the vagina was the point affected. No cause of this distribution is assignable. Although most of the reported cases occurred at the period of greatest sexual activity, age seems to exert no special influence upon the development of fibroma, for it has been found in early childhood (Martin, Wilson, Trätzl) and at the age of fifty-one (Greene). Its growth is slow—in Neugebauer's case twenty-two years, and in Greene's

<sup>1</sup> *Zeitschrift für Heilkunde*, 1882.

<sup>2</sup> *Loc. cit.*, p. 348.



fourteen, having passed since the patient knew of the existence of the tumor.

Its histological structure may be either that of a pure connective tissue or muscular growth, the latter greatly predominating in frequency; Klebs and Virchow so regularly found smooth unstriated muscular fibre in sessile growths of this kind as to assimilate them with uterine fibro-myomata, of which I have elsewhere<sup>1</sup> described the composition. At least one case has been described (by Sir James Paget) consisting of pure connective tissue.

The growth originates in either the submucous or the muscular layer of the vaginal wall. Virchow believes it grows from without inward, and has never met with the polypoid form of myomata. Undoubtedly, the tendency of vaginal fibroids is to become pediculated and polypoid as they increase in size, and to project first into the vagina and then outside the vulva. This is illustrated by the cases reported by Demarquay, Scanzoni, Dufour, Neugebauer, Porro, and others. In Scanzoni's case the pedicle was thin; generally it is thick and vascular. The size of the tumor may vary from that of a bean or lentil to that of a child's head at full term; in Gremler's much-quoted case<sup>2</sup> it weighed more than ten pounds: in one observed by Baudier it was equally large; a number of others have been over two pounds.

The SYMPTOMS of vaginal fibroma may be absolutely negative; and when the growth is very small this is so, and its discovery is made by accident. When larger, it occasions dragging pelvic pain, rectal and vesical pressure, leucorrhœa, dysuria, and even retention of urine, dyspareunia. If complicated by pregnancy, it may effectually arrest the progress of labor, as in cases reported by Gentrul, Pelletan and Van Doeveren, McClintock (who met with two such), and Gremler. When the tumor has been extruded from the vulva it causes the same discomforts that attend procidentia of the uterus from venous stasis, ulceration, and irritation of the neighboring parts.

The DIAGNOSIS is readily made, for the firm, elastic, and often lobulated surface of the growth indicates its nature. It may be simulated by a cyst with firm, elastic walls, in which case exploratory puncture, as practised by Demarquay and others, will aid us to decide. From sarcoma it is more difficult, if not impossible, to distinguish it, except by microscopic section.

The PROGNOSIS is favorable unless ulceration of the tumor has begun; then the risk of septicæmia is so considerable that a more guarded prognosis must be given.

The TREATMENT consists in extirpation only. This may be accomplished by enucleation, which is most generally applicable, by excision, or by ligature when the growth is pediculated. If the tumor be deeply

<sup>1</sup> Ashhurst's *Internat. Encyc. of Surgery*, vi. 808.

<sup>2</sup> *Med. Zeitung*, 1843

imbedded, enucleation is by no means easy, for enough of the wall-covering must be preserved to effect easy union of the remaining wound and prevent the formation of a pocket; to secure this, the surface tissues must be peeled with the finger-nail or the handle of the scalpel. In pedunculated growths the pedicle, if it can be reached, should be perforated with a needle carrying a stout double ligature of silk, which is to be crossed and tied securely on both sides. This best guards against hemorrhage, which is always the risk to be apprehended, and in the case of large fibromata this may be very severe. It occurred to an alarming extent in Neugebauer's case when écrasement and the galvanocautery were used. In any case, whether the tumor be pediculated or sessile, after its removal is effected carefully-adjusted sutures should be applied to close as accurately as possible the vaginal wound (and these must be very deep when the cavity is deep), and the vaginal wall supported by a tampon of iodoform gauze until union is secured. In removing this tampon every second day antiseptic injections should be used, and the wound then freshly dusted with iodoform.

II. SARCOMA OF THE VAGINA is yet more rare than fibromatous growths, and has only recently attracted the attention of observers. Accurately-noted cases, where the diagnosis was assured by microscopical examinations, have been recorded by Mann,<sup>1</sup> Säger,<sup>2</sup> Hauser, Bajardi, A. R. Simpson,<sup>3</sup> Simmons,<sup>4</sup> Ahlfeld, Demme, Spiegelberg,<sup>5</sup> Babes, Kasehwarowa, Meadows,<sup>6</sup> Fraenkel, and Soltmann;<sup>7</sup> perhaps by others who have escaped my attention. Of these reports, Säger's may be consulted for the literature of the subject up to the date of his paper, and Breisky<sup>8</sup> for an analysis of the more interesting cases.

As in the uterus, sarcoma of the vagina appears in two distinct forms—as diffuse degenerative deposit on the surface, or as a round circumscribed tumor in the submucous tissue. The difficulty of distinguishing it from carcinoma on the one hand and from fibromatous growths on the other will thus be seen at a glance. It may occur at all ages, three of the cases reported having been those of children, of whom the eldest (Demme's) was five and a half years old.

The SYMPTOMS are negative in the early stages; later, in the round tumorous form, they are the same as those of fibromatous growths, with the addition of much aching pain; in the diffuse variety there is less pain, but a constant leucorrhœal, semi-purulent, or sanious discharge which attracts attention and annoys the patient. In both there is a distinct cachexia, but less marked than in cancer.

These symptoms indicate the DIAGNOSIS; but, as already stated, the

<sup>1</sup> *Am. Journal Obstet.*, viii. 541.

<sup>2</sup> *Contrib. to Obstet. and Gyn.*, 204.

<sup>3</sup> *Arch. für Gyn.*, iv. 344.

<sup>4</sup> *Schmidt's Jahrbücher*, 1882.

<sup>5</sup> *Wiener med. Wochenschr.*, 1880.

<sup>6</sup> *Edinburgh Med. Journal*, 1885.

<sup>7</sup> *Trans. London Obstet. Society*, vol. x.

<sup>8</sup> *Loc. cit.*, p. 356.

differentiation of the two specified forms from fibroid and cancerous growths is so difficult that we are compelled to rely upon the microscope alone.

The PROGNOSIS is exceedingly serious, and its gravity should be frankly stated to the patient or her friends at the same time that prompt removal of the growth is urged upon them. In the fibroma-like form it is rather more favorable, at least one case of this (Spiegelberg's) having suffered no relapse for four years, at the end of which time the patient was lost sight of.

The TREATMENT consists in removal of the growth as soon as detected, and as completely as this can be accomplished. In the circumscribed form this is to be done, or attempted, as for myomata—by excision or enucleation. In a number of recorded cases this has been done; as, for example, in Bajardi's, where a pediculated tumor the size of a hen's egg, which proved to be a round-celled sarcoma, was removed by the galvano-cautery; in three months it had returned, and two sessile tumors were now found in the posterior wall near the site of the former pedicle. These also were removed with the galvano-cautery; again relapse occurred, and in eight months more the patient died of peritonitis.<sup>1</sup> When it occurs in the diffuse form, vaginal sarcoma may be palliated by careful curetting, followed by iodoform or other antiseptic dressing. This is the more intractable and rapidly fatal variety.

III. CARCINOMA OR CANCROID OF THE VAGINA is also exceedingly rare as a primary disease, although we constantly meet with it in the fornix as an extension of cancer of the cervix. This is easily explicable by the histological difference of the two contiguous regions. In 1885, Grammatikati<sup>2</sup> tabulated 38 cases of the disease; but Küstner, whose classical paper<sup>3</sup> on this subject is often quoted, rejects a number of reported cases as doubtful and reduces the number to 22, to which Olshausen has lately added 2 more. Beigel was able to collect but 14 cases out of 8287 examined.<sup>4</sup> In far-advanced cases of proliferating cancer of the cervix it is quite easy to mistake the disease as vaginal, for the cervix is here extremely difficult to reach and the vagina is filled with the deposit. Two years ago I saw in consultation an elderly lady where this condition was so extreme that it was only at the autopsy that the uterine origin of the malady could be verified. In such doubtful cases a careful rectal examination will often be of material aid, but not always.

Like sarcoma, cancer of the vagina occurs in two forms of development—as a diffuse infiltrating deposit which sometimes encircles the

<sup>1</sup> Vide Breisky: *loc. cit.*, p. 358, for details of other interesting cases.

<sup>2</sup> *Centralb. f. Gyn.*, 1885.

<sup>3</sup> *Archiv f. Gyn.*, ix. 279.

<sup>4</sup> Hart and Barbour: *loc. cit.*, p. 506.

canal as a ring-like constriction, or as a broad-based glandular or papillomatous tumor which is chiefly found in the posterior wall.

It has only once<sup>1</sup> been observed in childhood, so far as I know, but in adults has been found at all ages from twenty to sixty: most of the cases have occurred between thirty and forty, and two between fifteen and twenty. One (Bailly's) case has been complicated by pregnancy, the growth being discovered at the fifth month; during delivery it formed a serious obstacle, the child being finally removed with forceps, and five months later it proved fatal from exhaustion.

The SYMPTOMS are hemorrhage, purulent or watery discharge which is peculiarly offensive, and occasionally pain. The latter is rarely constant, and may occur only during coition or in straining at defecation. If stenosis of the vagina ensue from the advancing constriction, there may be superadded to these the results of pressure or strain upon contiguous organs.

Often in the later stages there is deep and rapidly advancing ulceration, which may perforate the vaginal wall and establish fistulous communication with the rectum or bladder.

The cachexia is as usual in all forms of cancer, and enlargement of the lymphatic glands often occurs. From the vascularity and softness of the vaginal walls the disease advances with great rapidity: it assumes usually the epithelial or vegetative form, but a few cases of true scirrhous cancer are on record.

If the above symptoms be borne in mind, the DIAGNOSIS of vaginal cancer can present but two difficulties—differentiation from sarcoma and from cervical cancer. The former is possible only by the microscope; in even the worst cases the latter can generally be established by careful rectal examination.

Although the ultimate PROGNOSIS is necessarily fatal, much may be done to palliate the patient's discomfort and even to lengthen her life.

The TREATMENT consists only in extirpation of the growth, or of as much of it as can be safely removed by the knife, curette, or galvano-cautery. Breisky thinks its nugatory results have heretofore arisen from the difficulty of effecting complete removal of the growths; but, in addition to this, it may well be doubted whether in tissues as soft and vascular as those of the vaginal walls infiltration of the surrounding parts has not always progressed beyond the points recognizable by us. Its uniform return certainly indicates this probability. Still, extirpation should always be attempted, and if possible with the knife by excision in preference to other methods. If in this it be necessary to cut into the rectum or bladder, we should do so if there be a chance of closing the fistula thus caused. Schroeder has operated thus radically in three cases; and recently, in removing a cervical epithelioma with

<sup>1</sup> Vide Breisky's description of a specimen in the Strassburg Museum: *loc. cit.*, p. 360.



secondary cancer of the anterior fornix, I was obliged to dissect the latter out completely, but with careful drainage obtained good union by granulation; and thus far (four months after operation) there has been no return of the disease. If it be at all possible to close the resulting wound with sutures, this should be done; the risks of hemorrhage are thus lessened and the chance of union in the wound improved. With either knife or galvano-cantery the risk of primary hemorrhage is considerable, at least one fatal case (Grünewaldt's) being reported from this cause; with the sharp or blunt curette it is less, but the process is less effective. All the aseptic precautions and tonic after-treatment appropriate for other forms of cancer should here be adopted.

IV. TUBERCULOSIS OF THE VAGINA has been described by Klob,<sup>1</sup> Virchow, Deschamps,<sup>2</sup> Hegar,<sup>3</sup> and Schroeder: fourteen well-marked cases have been tabulated by Deschamps up to the end of 1884. It is, however, not only exceedingly rare, so as to be chiefly a medical curiosity, but important only as indicative of a general constitutional diathesis. Its characteristics are tubercles and tubercular ulcers on the vaginal mucous membrane, associated with the same condition in the lungs and in other parts of the body.

V. CYSTS OF THE VAGINA are much more frequently found than any other form of neoplasm, but are yet considered rarities by most writers. Von Prenschen<sup>4</sup> states that they have been found in six out of thirty-six cadavers examined for them. When small we probably fail to detect them in many existing cases, and Gräfe<sup>5</sup> thinks that larger ones are sometimes mistaken for conditions of incurable prolapse. They have been found at all ages, most frequently, of course, in middle-aged adults, as in them the vagina is most often examined; but in at least two cases recorded by Winckel and Breisky<sup>6</sup> they occurred in newborn infants.

They may be either single or multiple, Gräfe having reported a case from Schroeder's practice where "six cysts lay one below the other, the lowest projecting into the vagina, and arranged spirally from the right backward to the left and from the introitus to the fornix." Most often they are single, occurring indifferently in the upper, lower, or middle third of the vagina, and rather more frequently on the anterior wall. Of 61 cases tabulated by Gräfe, 29 were found in the anterior wall, 21 in the posterior wall, and 11 in the lateral walls of the vagina. In size they vary from that of a cherry or less to that of a goose-egg; in a very few exceptional cases they have been much larger, filling the entire vagina, J. Veit<sup>7</sup> recording one of the size of a child's head at

<sup>1</sup> *Path. Anat. der Weib. Sexual-organ.*, Wien, 1864, p. 432.

<sup>2</sup> *Archiv de Tocologie*, 1885, p. 19.

<sup>4</sup> *Real Encyk. der gesamt. Heilk.*

<sup>6</sup> *Loc. cit.*, p. 342.

<sup>3</sup> *Genital-tuberculose des Weibes*, 1868.

<sup>5</sup> *Zeitsch. f. Geb. u. Gyn.*, B. vii. H. 2.

<sup>7</sup> *Zeitsch. f. Geb. u. Gynäk.*, viii. 324.

full term, and Noyes<sup>1</sup> another of the size of two fists. In the latter case the cyst had been known to exist for sixteen years, and grew from the anterior wall. The walls of these cysts may be either thick or thin, varying, according to Parvin,<sup>2</sup> from one centimeter to one millimeter in diameter; formed commonly of connective tissue only, they may also contain muscular fibres, and are lined internally with cylindrical epi-

FIG. 13.



Section of Vaginal Cyst. The cyst-wall, which is lined with a single layer of epithelium, is separated by some tissue from the mucous membrane, which is covered with many layers of squamous epithelium not detailed in the section (Schroeder).

thelium (Ruge). According to Gräfe,<sup>3</sup> they originate in Gärtner's canal or in a part of the duct of Müller, as retention-cysts in dilations of the lymph-ducts, or they may result from œdemas or bloody effusions in the connective tissue of the vaginal wall. In addition to these sources of cystic development, Porak<sup>4</sup> has described a unique case of suppurating hydatid of the vagina. Their contents vary from a thin serous fluid to a thick, gelatinous formation, and may be either clear or straw-colored, or opaque and as dark as chocolate. Under the microscope this is found to contain oil-globules, granular cells, pus, blood, epithelium; sometimes cholesterol; sometimes no morphological elements at all are found. The presence of cholesterol gives an emulsion-like appearance to the fluid.

The SYMPTOMS of vaginal cysts, when of small size, will often be negative; when pediculated and projecting at the vulva or when large enough to cause pressure, they induce leucorrhœa, bearing-down sensations of discomfort, and dysparennia. In two cases which I have removed from middle-aged subjects, and which have been published,<sup>5</sup> all these symptoms were extremely developed. In Dr. R. Watts' rare case,<sup>6</sup> where the cyst was developed from Gärtner's canal, there was much vesical discomfort and difficulty in micturition.

<sup>1</sup> *Boston Med. and Surg. Journal*, 1861.

<sup>2</sup> Ashhurst's *International Encyc. of Surgery*, vi. 712.

<sup>3</sup> *Loc. cit.*, S. 460.

<sup>4</sup> *Archiv de Tocologie*, 1884, 163.

<sup>5</sup> *Amer. Journ. Obstet.*, vol. xix.

<sup>6</sup> *Ibid.*, vol. xiv.

The DIAGNOSIS, except in very small cysts, should not be difficult. Their unmistakable sense of fluctuation and their smooth elastic surface combine to distinguish them from solid tumors and from either cystocele or rectocele. If in doubt, aspiration should be practised, and the fluid obtained will indicate the nature of the growth. When near the introitus vaginæ much care must be exercised to distinguish them from the retention-cysts caused by suppuration or obstruction of Bartholini's glands.

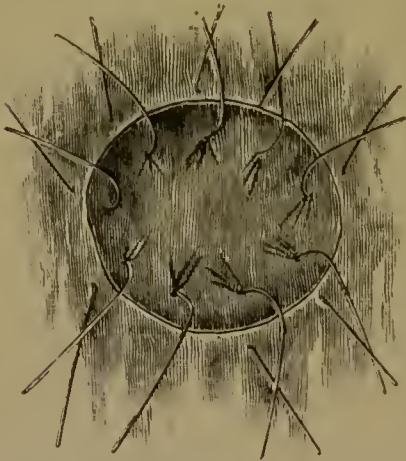
The PROGNOSIS is favorable, but in exceptionally large growths it must be given more guardedly.

The TREATMENT, to be curative, must be excision, either of the whole growth or of enough of the cyst-wall to destroy its lining membrane and to cause adhesive inflammation of its sides.

In the first of the cases I removed I was able to dissect out the cyst *in toto*, and, bringing the sides of the resulting cavity together with silver sutures, obtained excellent union. In the second I found this more difficult, as the cyst, which covered the whole lower third of the anterior wall, was deeply seated, and so intimately connected with the

*bas-fond* of the bladder that I feared extensive injury to the latter in its dissection. Schroeder's method was therefore adopted, as advised by Hegar and Kaltenbaeh. This essentially consists in excising the most projecting part of the cyst-wall, together with the mucous membrane that covers it, emptying the cyst, and scarifying or cauterizing its lining membrane, and then uniting with sutures the margins of the cyst and vaginal wall, as shown in Fig. 14. As the sutures are tightened the cyst-cavity is rolled out until it becomes flush with the vaginal surface, after which it soon loses its

FIG. 14.



Removal of Vaginal Cyst by Schroeder's Method.

distinguishing character and assumes those of the surrounding vaginal mucous membrane. Should hemorrhage occur—and it is sometimes quite copious—deep sutures form our best safeguard against it. The surface should afterward be supported by an antiseptic tampon.

NOTE.—Since the foregoing article was written a most comprehensive and intelligently-written paper, entitled "A Contribution to the Study of Cysts of the Vagina," has been published by Dr. George W. Johnston of Washington in the *Am. Journ. of Obstet. and Dis. of Women and Children*, vol. xx. Nos. 11 and 12, to which the reader's attention is particularly directed.

# THE HYSTERO-NEUROSES.

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## PART I.—GENERAL.

### I. DEFINITION.

By the term Hystero-neuroses I have designated those phenomena which simulate a morbid condition in an organ which is in an anatomically healthy state, and which are due not to structural changes in the organ in which they appear, but to morbid or physiological changes in the uterus and ovaries. The hystero-neurosis is a sympathetic hyperæsthesia, the result of reflex action due to uterine derangement, and demonstrated to be unquestionably so dependent by being intractable to direct local medication, but yielding at once to treatment of the causative pelvic disorder. These reflexes are most varied in character, being determined by the numerous ramifications of the ganglionic and spinal nerves and centres, to which morbid impulses are conveyed by connecting fibres from the uterine and ovarian nerves; they appear most frequently as nerve-pains central and peripheral, as changes in the circulation, and as gastric and cardiac symptoms. The direction of nervous influences like that of the electric current is determined either by the character of the conductor or by the terminal attraction: uterine irritation is transmitted either by such nerve-tract, which is already in a state of morbid irritability, to the organ supplied by its terminal fibres, or it is carried by the most direct course to such organ, which submits most readily to the morbid impulse, either by reason of its lessened resistance, an already lowered vitality, or an existing hypersensitiveness: both forces seek the most perfect conductor, and travel directly along such course to the point of greatest attraction, developing their full effect at the terminal radiations. Thus the irritation of the ganglionic nervous system, caused by morbid changes in uterine and ovarian tissue, is most readily conveyed to the spinal and cerebral



centres, following sometimes one, sometimes another path, and results in the lumbar or hypogastric pains, in the burning or pain in the top of the head or back of the neck: most intimate is the connection of the ganglionic with the vaso-motor nerves; hence changes in the uterine tissue influence, through the ganglionic centres, the vaso-motor nerves, and produce either relaxation, which is so often made apparent by flushes, swelling, heat and redness of the surface, or hyperactivity, marked by vascular contraction, by a chill or coldness of the extremities: by their connection with the vagus are brought about the palpitations of the heart, the nausea and vomiting, by which the stomach tells of uterine changes. The anastomosing fibres of the solar plexus account for the gaseous distension of the abdomen, the constipation and diarrhoea, by which uterine changes find expression.

These symptoms are entirely distinct from the transitory and variable ones of hysteria, which I am inclined to place among the cerebro-spinal affections, and which are but indirectly influenced by the uterus and its annexa. As hystero-neuroses, I consider only such appearances of disease, without structural changes in the organ in which they occur, which are the direct result of reflex nervous influence, dependent upon changes in uterus or ovaries, coming and going, aggravated or improved with corresponding changes in the determining causative disease. We must strictly eliminate coexisting symptoms and symptoms arising from direct mechanical causes: thus the stiffness of the leg, with the shooting pain which follows the course of the nerve, often found in ovarian and periuterine disease at the time of the menstrual period, is not an hystero-neurosis, not a reflex nerve-symptom, but the direct result of pressure by the congested tissues or the enlarged ovary upon the pelvic portion of the nerve: frequent and painful micturition, dysuria as it is observed during the menstrual period, may be a neurosis pure and simple, but it is more frequently the result of increased pressure of the congested uterus upon urethra or bladder. Such symptoms as are produced directly by contact, by pressure upon tissues, nerves, or vessels, must not be confounded with a neurosis, with those symptoms determined only by reflex nerve-action.

## II. VARIOUS FORMS OF HYSTERO-NEUROSES.

As these reflex neuroses are due to changes, pathological and physiological, in uterus and ovaries, we may look for their occurrence in disease and during periods of heightened functional activity; hence I have classified the hystero-neuroses,

First, as pathological;

Second, as physiological.

The physiological neuroses are those reflex symptoms which appear

during the periods of increased functional activity at puberty and the menopause, during menstruation and pregnancy.<sup>1</sup>

#### FIRST.—PATHOLOGICAL HYSTERO-NEUROSES.

These are symptoms referable to, and caused by, a pathological condition of some part of the female sexual apparatus, aggravated by such causes as intensify uterine disease; they are usually heightened by, or appear only during, the periods of physiological congestion.

I shall treat here of the pathological neuroses or the reflex symptoms accompanying uterine disease, as I look upon these as the most important to the practitioner and as the most occult and least readily recognized.

#### SECOND.—THE PHYSIOLOGICAL HYSTERO-NEUROSES.

##### *a. Hystero-neuroses of puberty; and b. The menopause.*

These two most important epochs in the sexual life of woman, the coming and going of the menstrual period, are marked by increased susceptibility of the nervous system: the peculiarities of temperament, the freaks and nervous pains with which women are afflicted at these times, are well known in a general way, although they have never been thoroughly classified or understood. Even Tilt in his classical work on *The Changes of Life in Health and Disease*, in which he enumerates and graphically describes the neuroses of the menopause, confounds the neuroses pure and simple—of certain of which he speaks as gangliopathies—with the diseases proper of the menopause. If we glance for a moment at his tables, in which he depicts the relative frequency of morbid liabilities at the change of life in 500 women, we find nervous irritability in 459, flushes in 287, pseudo-narcotism in 277, dorsal pain in 226, gangliopathy and faintness in 220, headache in 208, abdominal pain in 205, perspirations in 201; but with these he names leucorrhœa, which is a disease, and not a neurosis, in 146 cases; an hysterical state in 146; flooding of the bowels, biliousness, gangliopathy or strange epigastric sensations in 49; phosphatic or lithic urine in 49; diarrhœa in 45; chloro-anæmia in 40; dyspepsia in 37; and so on. I have quoted this table—from which we see that those neuroses which are most common at the change of life are also among the most common of the pathological neuroses or the neuroses accompanying uterine disease—to show the existing confusion: symptoms which are peculiar to the menopause

<sup>1</sup> This classification is the most simple, though not strictly correct, as many of those neuroses which are thereby termed physiological because they accompany the physiological congestion, are, in fact, pathological, caused by morbid states of the uterus, but dormant until aroused by the heightened irritation of uterine disease plus physiological congestion. Yet I adhere to these terms, as they facilitate understanding.

are placed side by side with reflex symptoms which are among the most frequent evidences of uterine disease at all times—the most frequent reflex neuroses which are caused by disturbances in the female sexual organs, determined alike by pathological conditions, by the changes of puberty, menstruation, or the menopause.

Tilt in describing the diseases of that period has given us a most excellent sketch of the hystero-neuroses as they are found during the entire period of female sexual life.

*c. The menstrual hystero-neuroses.*

I have so termed those neuroses which appear at the time of the menstrual congestion, but in few cases only are they determined by the physiological state pure and simple in a healthy organ. They are mostly dependent upon inflammation or displacement, aggravated by the physiological congestion of menstruation, their peculiarity being that they come at this time only. They are often determined by pathological conditions which in themselves are insufficient to bring about the neurosis, and only with the increased congestion or heightened nervous susceptibility accompanying the menstrual state does the neurosis appear, the pathological condition in itself being insufficient to excite the symptoms which are at once developed by the additional impetus of the physiological congestion. It is upon the congestion and the increased nervous excitability of the menstrual state that these neuroses depend—greater pressure, increase of the causative irritation in the uterus, heightened functional activity, and greater susceptibility of the affected organ and its nerve-fibres; hence they appear not at the time of the sanguineous flow, but during the entire period of congestion, beginning from two or three days to one week before the appearance of the flow, and passing away two or three days after its cessation, often disappearing during its continuance, whilst depletion is in progress.

*d. Hystero-neuroses of pregnancy.*

Unlike the neuroses of menstruation, those of pregnancy appear more frequently in response to physiological changes pure and simple, and less often to an aggravation of the exciting pathological state caused by the heightened vitality and increased functional activity of the organ during the pregnant state.

These symptoms frequently appear, like the menstrual neuroses, with the congestion and enlargement immediately following conception, and cease with the evacuation of the uterine cavity and the consequent depletion and contraction. The more common hystero-neuroses of pregnancy are known as the doubtful signs of pregnancy; and so well known are certain of these neuroses and their connection with the pregnant state that they are looked upon as probable signs of pregnancy, and as the earliest signs: so frequent is their occurrence that

they have been looked upon as an evidence of pregnancy even by the laity, even by the ignorant among peoples civilized and savage, and by the obstetric writers since the time of Hippocrates. But with the progress of medical science, remarkable as it may seem, our knowledge of these interesting genito-reflex neuroses has retrograded, and these symptoms are not as well known now as they were to the Greek physicians of the earlier centuries. They are determined by that congestion and enlargement and changed nervous state which appears soon after conception takes place, long before visible and palpable changes are such as to assure us of the condition which exists. Though the reflex nervous phenomena, the hystero-neuroses, are among the first evidences of pregnancy, they are correctly known as doubtful signs, since, as we well know, they are merely the results of nutritive changes which accompany pathological as well as physiological conditions; and the same reflex may appear in response to the irritation conveyed to the nearest ganglia from an erosion of the cervix; from increased discharge, whether this be due to congestion and hypertrophy of the mucosa; from pathological or physiological causes: nausea and vomiting may occur, or the moral nature will be perverted alike in consequence of a flexion, an induration, a laceration, or a physiological tumefaction of the tissues, thickening of the mucosa, or closing of the os. The signs are doubtful, because they result alike from pregnancy and from disease.

### III. IMPORTANCE.

The importance of the neuroses, this varied conglomeration of symptoms, always peculiar, of which the genito-reflex neuroses are a part only, has never been fully appreciated, and, in fact, they have never been understood, never studied as a whole: a single group only, I believe, the cardiac neuroses, developed by Flint, has entered medical literature: no less important are the bronchial neuroses, the dermatoses and psychoses, the male and female genito-reflex neuroses, the nasal and anal reflexes, with others less frequent and less important. A trifling derangement in a sensitive organ, not sufficient to attract attention, to cause pain or even discomfort in the part affected, may be the exciting cause, and distant organs respond most violently to this slight abnormality, as the alarm-gong sounds in answer to the tap on the button of the distant station. The distribution of the sympathetic and the ganglionic systems, connecting in innumerable filaments with the ramifications of the spinal nerves, central and peripheral, leads to the most curious and unexpected reflex symptoms. These neuroses may be likened to the explosion caused in the magazine by the small spark which has ignited the fuse at a distant point: they are the symptoms by which pathological conditions,



generally insignificant in character, find expression in vital organs; and, whilst these phenomena may result from irritation of terminal nerves in any part, the most numerous and the most striking are those which appear in response to genital lesions.

An injury in one part of the body is marked by pain in another: severe attacks of asthma are often dependent upon a circumscribed hypertrophy of the mucous membrane in the posterior nares, intense headaches upon gastric disturbance; and, *vice versa*, the stomach responds to cerebral changes. Among the best examples of this peculiar reflex nerve-action are the convulsions of childhood and the symptoms of hip disease caused by the adherent prepuce in the male infant.<sup>1</sup>

I merely refer to these well-established reflex phenomena as identical with that great class of neuroses which are referable to the female sexual organs and which I have described as the Hystero-neuroses; and I need hardly state the self-evident fact that in the highly-sensitive nervous organization of woman we find these reflex symptoms most frequent and intense, and that they are most fully developed in response to lesions of the sexual organs, the controlling influence in the functional life of woman. Whilst these symptoms have been practically ignored by the scientific physician, who has recognized but an insignificant group as the doubtful or early symptoms of pregnancy, they have been observed from time immemorial by the laity; and I may almost say that these neuroses of pregnancy, these doubtful signs of conception, have been accepted by the profession in acknowledgment of popular beliefs and of medical tradition from the time of Hippocrates. Thus the ancients mainly recognized the symptoms which have now become obsolete, such as salivation and the enlargement of the neck: the Roman matron cast a fillet around the bride's throat before and after the nuptial night, in order to discover whether marriage had been consummated or not—a tribute to the congestion of the thyroid in response to uterine irritation. Horse-breeders at the present day in certain districts measure the necks of their mares before and after they have been covered to determine whether the intercourse has been a fruitful one.<sup>2</sup>

The most common and best known of these genito-reflex phenomena is the morning sickness of early pregnancy, and this at the same time offers a striking example of the importance of the hystero-neuroses. To the ignorance of the reflex nature of this irritation of the stomach resulting from uterine congestion many a young life has been sacrificed:

<sup>1</sup> The convulsions of teething, which in the popular mind exist as an almost unavoidable accompaniment of this stage of development, are often reflex in their nature, the result of terminal nerve-pressure. The muco-cutaneous border, with its sensitive fibres, is a favored centre; anal fissures and urethral caruncles are characterized by reflex symptoms often more annoying even than the distressing local pains.

<sup>2</sup> Goodell: *Transactions American Gynecological Society*, vol. i. p. 211.

many a young wife, happy in the expectations of motherhood, has fallen a victim to the violence of reflex nerve-action, heightened to its greatest intensity in this period of female functional activity.<sup>1</sup> Too long neglected, this group of symptoms should at length receive the attention which it justly merits, and they should be accorded due prominence in medical literature on account of their manifold importance, which is (a) practical, (b) scientific, and (c) medico-legal.

*a. Practical Importance.*—A thorough understanding of these symptoms, these functional perversions in vital organs in response to trifling uterine lesions, is necessary, not alone to the gynecologist, but above all to the physician in his daily practice; an understanding of these symptoms is necessary, not alone for the diagnosis of uterine and ovarian disease, but for the correct treatment of the symptom, which is often far more annoying to the patient than the disease by which it is caused. To the gynecologist these phenomena are but curious accompaniments of uterine disease, and he naturally pursues the only correct and possible method of relief—the treatment of the local disturbance. But the general practitioner who fails to recognize the neurosis toys with health, if not with life: deceived by the perfect identity of the symptoms, deceived by this semblance of disease in a perfectly healthy organ, he treats that organ for the supposed disease, and treats it in vain. The stomach is irritated, the system is ruined by constant medication, and the uterine disease, which is completely ignored, grows gradually worse; the reflex symptoms are correspondingly aggravated, more powerful medication is resorted to, and thus the health of the patient suffers, if her life is not endangered, by the error in diagnosis—the mistaking of the mere semblance, the reflection, for the disease proper. Such cases are not recognized and are not reported; they are regarded as puzzling and obscure by the attending physician, and the patient as an hysterical crank: the disease is not an unusual one, yet all usual remedies fail; the sufferer passes from hand to hand, satisfied to continue existence as an invalid if death does not put an end to her suffering. Innumerable women have been treated for gastric troubles, mainly dyspepsia or nerve-pains, for cerebral disturbance, and for weak eyes, and have gone through the entire pharmacopœia—“taken whole drug-stores,” as they state—until they have given up all hope of improvement, and have become resigned to their fate, simply because a trifling uterine lesion has been obscured by the violence of the reflex symptom, which is not recognized as a neurosis, but treated as a disease.

<sup>1</sup> Sad results such as this are unfortunately too frequent: equally sad, and still more obscure, are those cases of asthma, dyspepsia, headache, and mental derangement which resist all efforts of the physician and doom the sufferer to hopeless invalidism,—all because a simple uterine derangement, of which the supposed disease is but a reflex symptom, is overlooked or ignored.

Am I not justified in emphasizing the importance of these neuroses? The healthy organ in which the phenomena occur is treated to the death: the causative uterine disease is ignored, because no pelvic or hypogastric pains exist, because no irregularity of menstruation occurs, or because the reflex symptoms so far exceed the trifling pelvic annoyance that the patient demands relief from that symptom which causes the greatest suffering, and both patient and physician overlook the lesser uterine trouble. Several cases now under my care will best exemplify the importance of these symptoms to the practitioner.

CASE I. *Gastric Hystero-neurosis: Failure of Medication.*—Mrs. M——, aged 34, laceration of the cervix; retroversion and descensus uteri, metritis and endometritis: four children, the oldest nine years of age. For the past eight years this patient has been under treatment for what every physician called gastric catarrh (neurosis of the stomach), constantly taking medicine, each of the four physicians who attended her in turn exhausting the pharmacopœia, until her stomach was weakened, her system debilitated; each one had given her particular orders forbidding such foods as he thought injurious; and whilst this poor woman, who needed nourishment and stimulation, was being medicated and starved, she was urged to exercise: her housework done, she walked or drove, and thus constantly aggravated the uterine disease. Backache or slight pelvic pains were ignored, and so treatment was continued until she was brought to bed by an exacerbation of the uterine disease; and even then the pelvic trouble would have been overlooked had not the extreme displacement of the congested uterine caused most painful dysuria, and caused me to be consulted on account of the bladder trouble. I found an ugly state of affairs: the ovaries were congested, the ligaments very much relaxed, the uterus greatly enlarged, the muscular tissue and the mucous membrane thickened and congested, so that I at once inaugurated treatment of the uterine and ovarian disease, regardless of stomach or bladder. As the uterine congestion was reduced and the position of the organ improved, both dysuria and dyspepsia were bettered; all medication was stopped, and this patient, who had for eight years been treated as a dyspeptic, dieted and medicated, was enabled to eat with the rest. I restricted her in no way, and she digested all foods alike, notwithstanding the weakening of the stomach by continued treatment and dieting.

The chronic uterine disease has improved very slowly; hence occasional attacks of dyspepsia still occur: these are not due, however, to the character of the food, but to the condition of the uterine; and at these times the stomach resents the lightest diet, milk and lime-water, precisely as it does heavier food. For eight years this patient has steadily aggravated the uterine disease by needless exertion, has weakened her constitution and ruined her stomach by careful dieting and



gastric medication, until her health is completely broken. Physician after physician attacked the healthy stomach for the semblance of gastric disease resulting from the comparatively painless uterine disturbance.

CASE II. *Central and Peripheral Cerebral Reflexes: Failure of Direct Treatment.*—Mrs. B——, aged 32, a sufferer from constant headaches, with exacerbations which resulted in symptoms resembling mania. No pelvic pains, no backaches; menstruation regular; patient suffers constantly, and is under treatment by a local physician in her Western home; though now and then temporary improvement was visible, her condition grew steadily worse. The suffering, which had begun with dull headaches, attained such intensity that physicians were consulted in larger cities; she was plied with nervines and sedatives without the slightest benefit; her nerves were shattered, her stomach ruined, and her condition such that she rushed screaming into the street at night; and as a last resort the physician then attending suggested the insane asylum. No physician had ever examined the uterus or inquired as to the status of the reproductive organs, as every one was perfectly satisfied with her statement that menstruation was regular and her back free from pain. Influenced by female friends and by her own belief and hope in the possibility of a causative uterine disease, she consulted me. I found an indurated, hyperplastic uterus, with a large, hard cervix and the remnants of an old laceration, the ligaments indurated, and indications of a perimetritis at an earlier day. Nervines and sedatives were stopped and local treatment inaugurated. Whilst I have not been able to overcome the symptoms, they have improved very much: a constant headache remains, but the excessive nervous irritability and maniacal symptoms have ceased. Notwithstanding the long duration of the disease and the injury done the stomach and nervous system by chloral and even stronger remedies, a three months' treatment of the metritis and endometritis served to make life more comfortable, to relieve the more violent symptoms, and to give the hope of recovery to this patient who had been upon the point of being thrust into an insane asylum for the semblance of mental disturbance, these violent reflex cerebral symptoms resulting from an apparently symptomless uterine disease.

CASE III. *Vomiting of Pregnancy: Resists Medication, yields at once to Uterine Applications.*—Mrs. X——, an only daughter, a bright, happy wife, pregnant with her first child, was attacked by nausea and vomiting; treated by various physicians, homœopaths and regulars, her condition grew steadily worse. The treatment, of course, was directed toward the organ affected with the semblance of disease, the stomach; medicine after medicine was tried; the vomiting grew worse, more frequent, until, when I saw her, without food for weeks,



this young bride, four months before the very picture of health and beauty, was upon the point of death, a haggard, emaciated wreck. Applications to the eroded and congested cervix and the inflamed mucons membrane stopped the vomiting within twelve hours; but notwithstanding this satisfactory response, death speedily followed, as the violence and long duration of the neurosis had sapped all vitality. I do not hesitate to state that if the causative disease had been treated in time, a few simple applications would have sufficed for the relief of the slight cervical catarrh and the erosion, which, by the violence of the reflex symptoms, proved fatal in the end.

These are indeed extreme cases, yet not altogether uncommon; and does not ignorance of these phenomena appear criminal when we see the persistent and misdirected treatment of the symptoms lead to years of suffering, to invalidism, and to death, whilst a few trifling applications to the uterus in the early stages would have afforded immediate relief?

*b. Scientific Importance.*—Important as a thorough understanding of these phenomena is to the practitioner, it is hardly less so to the student; as

1. It serves us in the correct development of medical science, the neuroses being the link which binds specialism and general medicine; and,

2. It is of value to the anatomist and physiologist in guiding him in the study of the anastomosing fibres of the ganglionic and spinal systems and their relative functions.

1. This era of medical specialism, to which we owe in so great a measure the marvellous progress of medical science and the brilliant developments in all its branches, has its faults as well; and the most grievous, which inevitably tends to deterioration, is the close limitation to specialism. The physician is lost in the specialist; the man of science becomes a mechanic who may be skilful in a laryngological operation or a uterine manipulation, but the system, the nervous organization, the circulation, the great vital forces, are forgotten in the one organ of the particular specialist, and no common bond exists between the specialists who treat these widely different parts. But, as Virchow has so justly emphasized in an address delivered some years ago, no man can be a thorough specialist who is not a good physician. The practical importance, the intensity, of these reflex phenomena demands attention, and forces the specialist from the narrow confines of a single organ upon broader ground, and necessitates a return to the thorough study of general medicine. Even more: this grand group of symptoms, emanating from an obscure localized irritation, affecting important organs most diverse in their phases, connecting distant parts by a chain of ganglionic and cerebro-spinal nerves, involving the system in all its

parts, forms a bond of union between the various specialities. It is a common centre toward which all must converge, a common ground upon which all may unite.

A gastric neurosis may be such as to puzzle the practitioner whether the stomach, the uterus, or the nervous system is at fault, and whether relief may be obtained by gynecological treatment, by gastric medication and diet, or by treatment of the nervous system. A neurosis of the eye will necessitate a careful examination of the eye, the brain, the kidneys, and the uterus. It is by concentration on the part of the scientific practitioner of the day that medical progress has been furthered; but this concentration soon tends to limitation, and whilst many are benefited not a few suffer. I have mentioned the sad case of a patient now under treatment for endometritis, metritis, and descensus uteri, who has been for eight years a sufferer from a gastric neurosis, and who has been under constant treatment for this most apparent symptom. Medication of course proved completely useless, yet it was tried again and again by physician after physician, as her failing health was attributed to the semblance of gastric disease, whilst the insidious uterine lesion escaped detection, as it was not announced by hemorrhage, menstrual pain, or backache, and slowly but surely progressed until it had undermined her entire system.

The ramification of the ganglionic and spinal nerves throughout the body may be compared to a network of electric wires; and whilst the irritation of the uterine terminals may find expression in chest or brain, the converse is equally true. The reproductive organs respond readily to a cerebral impulse by the intertwining of the ganglionic and cerebro-spinal system; morbid changes in the nerve-centres may determine functional changes in distant organs by the response of the terminal fibres to the central impulse; and in woman none respond more readily than those of the sexual organs.

The effect of sudden emotion, of joy or fear, upon rectal and vesical nerves is well known: uterine hemorrhage or the sudden checking of the monthly discharge or the flow of milk may be caused by a mental impression. It is not uncommon to see an amenorrhœa in emigrants: the change of life, the leaving of home and friends, produces a powerful mental impression, which results in a disturbance of the uterine function and consequent symptoms, such as backache and hypogastric pains; so that in this case we have a morbid condition of the nervous system marked by the symptoms of uterine disease which the thoughtless specialist would treat as such. More common and more striking is the picture so graphically drawn by Goodell<sup>1</sup> of the overtaxed school-girl, who begins to fail, loses her appetite, grows pale, is distressed by head-

<sup>1</sup> "Neurasthenia and Womb Disease," *Transactions of the American Gynecological Society*, vol. iii. p. 31.

ache, backache, spine-ache, and a sense of exhaustion; her catamenia, hitherto without suffering, become painful; her linen is stained by an exhausting leucorrhœa, and bladder trouble sets in; all the symptoms of uterine disease appear, and she is subjected to a painful examination and unnecessary and humiliating treatment. Now, whilst I will not say with Goodell, that "a moral rape is committed," the physician is guilty of a grievous error, and, as the author truly says, the patient drags herself from one consulting-room to another, until finally, in despair, she settles down on a sofa in a darkened room and lapses into invalidism.

Such are some of the sad results of confined and false specialism, best exemplified in cases of reflex neuroses, which are hence important to specialist and general practitioner alike; and I believe that the study of these symptoms will serve not only to check the narrow limitation of specialism, but to unite the practitioners of general medicine and the widely-separated specialists.

2. A careful observation of these phenomena must result in establishing much as yet undetermined in regard to the functions and ramifications of the ganglionic systems. By means of well-authenticated pathological facts the obscurities existing in anatomy and physiology may be cleared; hence the scientific importance of these reflex symptoms; and not until the anatomical relations and physiological functions of the various nerve-tracts have been traced from the terminal plates to the central ganglia will these curious reflexes be fully understood.

*c. Medico-legal Importance.*—The dangerous phases assumed by the cerebral neuroses give an aspect of legal import to the study of these phenomena (the hystero-neuroses), and upon the correct diagnosis of certain of these reflexes depends the good name, if not the liberty and even life, of the patient. The unfortunate invalid who is under the sway of irresistible impulses, whose actions are determined by a mere morbid reflection of uterine or ovarian impulses, is made to suffer alike with the wilful criminal unless protected by medical science. As early as 1845, English judges recognized the power of the reproductive organs upon the mind of woman (Tilt, p. 192), and they refused to inflict punishment upon the unfortunate mother who had murdered her child in an attack of puerperal mania.<sup>1</sup>

Most common among these central neuroses which may give rise to legal investigation are the actions of women under the influence of puerperal insanity, leading to infanticide, homicide, and suicidal mania, kleptomania, dipsomania, and suicidal mania, which appear either as

<sup>1</sup> Regina vs. Burk, Central Criminal Court, June, 1845. Murder of the child proven, but acquitted on the plea of being subject to disordered menstruation. Amelia G. Snoswell tried at Maidstone, March 20, 1855; acquitted on same ground.

pathological or as menstrual neuroses. The irritability, varying temper, and moral perversion accompanying uterine disease, and tending to exacerbation during the periods of physiological congestion, are liable to alienate the affections, to foster discord, and to force an innocent, loving wife into the divorce court.

Tilt truly says (p. 192): "Judges as enlightened as merciful have admitted the doctrine of uncontrollable impulses in cases of puerperal insanity; if they admit that parturition determines uncontrollable impulses, they must allow the possible occurrence of the same impulse at all the critical periods of woman's life—during puberty, pregnancy, lactation, at the menstrual period and cessation," and, I must add, in uterine disease as well.

I am justified, then, in my plea for a more careful study of the hysteroneuroses on the ground of—

(a) *Their practical importance to the gynecologist*, that he may detect uterine disease when the ordinary symptoms are wanting; to the general practitioner, that he may correctly diagnose and not maltreat, but overcome, suffering; and to the sufferer herself, who may be so easily relieved, and yet who so often becomes a lingering victim to the neurotic treatment of phantom disease.

(b) *Their scientific interest*, as they force the specialist from his narrow confines to the broad fields of scientific medicine, and serve to reunite the widely-separated interests of diverging specialties—as they aid the anatomist and the physiologist in tracing the anastomosing fibres of ganglionic and spinal nerves.

(c) *Their legal import*, by tempering the hand of justice and preserving the innocent and afflicted from the punishment of the guilty.

#### IV. HISTORY.

However well known the fact has been that curious symptoms on the part of various organs are referable to changes in the female genitalia, this knowledge has found credence among the laity alone: it is referred to by Greek and Roman writers. The neuroses as early symptoms of pregnancy alone have entered more fully into medical writings: alienists, more especially the French, have appreciated the influence of these organs upon the mind, yet the neuroses, as such, have never been fully appreciated; isolated cases, startling phenomena, have now and then been reported, but our textbooks do not accord the subject the attention it merits.

Hippocrates already mentions certain genital reflexes as symptoms of pregnancy: Marcé, Tuke, and others toward the end of the last century and the beginning of this have carefully studied the puerperal psychoses, and indicate their connection with changes in the reproduct-



ive organs; with the development of our physiological knowledge isolated cases of reflex disturbances were recognized, and during the last twenty years sporadic investigations have now and then appeared, but no decided progress was made, no permanent interest in the subject was aroused. Even the most important of these observations seem to have been doomed to oblivion.

A distinct series of hystero-psychoses has been described by Mayer of Berlin; Fordyce Barker, in his work on *Uterine Disease as an Exciting Cause of Insanity*, has cited characteristic cases; and Dr. Edgar Holden has described a most striking series of pharyngeal neuroses; but few, with the exception of the above mentioned, seem to have fully appreciated the existence of so well-defined a group of symptoms, characterized by their positive and striking dependence upon uterine or ovarian disease. Thus, Hodge in the sixth chapter of his work on *Diseases of Women* records cases which plainly belong among the hystero-neuroses as homologous with those which are decidedly hysterical, evidently without a proper appreciation of the causative relation in either case. Some such cases are mentioned by Tilt in his chapter on gangliopathy, and he places them on a par with those which are purely hysterical, and ascribes all to disease of the ganglionic nerves—diseases to which, he says, women at the change of life are especially subject. Both authors relate these cases indiscriminately and in such connection that it would but confuse the reader to refer to them. My attention was first attracted to this class of symptoms by the distension of the epigastrium which so frequently precedes the catamenial flow, and which I have described as the most common menstrual hystero-neurosis of the stomach. Since the appearance of my paper on the hystero-neuroses<sup>1</sup> the literature on this subject has rapidly increased, and yet I believe that it merits more careful investigation, and deserves a recognition in gynecological textbooks which is not yet accorded it.

Tilt in his work on the *Diseases of the Change of Life* describes these reflex phenomena most vividly, and, though he refers them to pathological or physiological changes in ovaries or uterus, he does not define the direct causative relation, nor does he clearly estimate this absolute dependence, since he seeks relief by medication and lays but little stress upon local treatment, which in a true neurosis is the direct and most efficacious means of cure, and, with the exception of sedatives, the only. He records the symptoms without fully appreciating their dependence, and considers them among the diseases peculiar to that period of life.

Esquirol frequently refers to the dependence of various forms and phases of insanity upon changes in the reproductive organs, the exacerbation of mental disease at the menstrual period, its inception at puberty

<sup>1</sup> *Transactions of the American Gynecological Society*, vol. iii., 1878.

or the menopause; yet rarely is a proof of the causative relation established by the restoration of a healthy mental state by gynecological treatment, and so only can the existence of a hystero-neurosis proper be proven.

The studies of Hegar are most interesting: he has been attracted to these marvellous phenomena by his observation of ovarian disease, and has pointed out to the profession the importance which attaches to these symptoms, which, by their diversity, unite upon themselves the varying interests of all branches of the profession.

Undoubtedly, these phenomena are determined mainly by the influence of the ganglionic nervous system: to the uterine ganglia an irritation of the terminal fibres is communicated, and thus the link is established by which the impulse can be directed toward any of the functional organs of the body, all organs of nutritive life being supplied with ganglia or a ganglionic plexus; the largest is in the pit of the stomach, the solar plexus; hence gastric neuroses are among the more common—distension of the stomach, faintness, perverted appetite; the vagus, itself an important tract, is in direct connection with the ganglionic centres, and carries the uterine impulse to heart, lungs and stomach, and no reflex, next to the gastric, is more common than the cardiac—palpitation, pain, and all the symptoms of heart disease. Few are more annoying than the bronchial, especially the asthmatic, attacks. This same nerve, so intimately connected with the ganglionic centres, is the bridge which connects this system to the spinal and cerebral centres, and admits of the direct transmission of the uterine impulse to the brain; hence the nerve-pains and mental phenomena. The ganglionic system directly follows the blood-vessels to the capillary circulation, so that we may readily appreciate the influence of uterine and ovarian impulse upon the circulation: the flushes, sweats, clammy coldness of hands and feet, are the expression given to uterine irritation by the circulatory system under the influence of the vaso-motor nerves.

No one neurosis is always referable to one and the same uterine or ovarian lesion, so far as I have observed. The irritation of the genital terminals I believe due to compression by the surrounding congested, hyperplastic, oedematous, or contracted tissues; and this is transmitted by the most available and homogeneous conductor to the point of greatest attraction. It may be likened to the electric current, which seeks through the network of wires the largest metallic surface over the most perfect metallic connection. The irritation of the uterine terminals is transmitted over nerve-fibres which are already in a state of morbid activity, and is thus guided to the nearest ganglionic centre, or it seeks, by the most direct path, a responsive central plexus, which is itself in an unstable equilibrium, with heightened susceptibility to impression, why, we cannot say. The effect of this compression is more clearly

demonstrated in the infantile convulsions which disappear when the cause is relieved by lancing a gum or by stretching the prepuce. In osseous structures the immediate site can be determined, and the surgeon gives relief by opening the unyielding canal. Yet I would not assume this as the one and only cause of genital neuroses, as is done by Ohr.<sup>1</sup> The cause may be an exposure of the nerve, as in an erosion, or a compression by congestion or hyperplasia from within; by a narrowing of the uterine canal by small growths, induration of the mucosa, or a flexion from without by superimposed structures: compression of the ovarian nerve-fibres is caused in the same way, especially by induration, chronic interstitial inflammation, yet I have rarely traced a reflex symptom distinctly to ovarian cause. This irritation of the terminal fibre may extend along the course of the nerve, and if continued for a length of time may result in a true morbid condition along the irritated tract.

CASE IV. *Continuance of Characteristic Hystero-neuroses after Removal of Uterus and Ovaries: Cure by Galvanic Treatment of the Causative Uterine Terminals.*—Patient was referred to the department for nervous diseases as an incurable after failure of all treatment, local and general, by the surgeon who had, with signal success, removed uterus and ovaries to save his patient, who had been rapidly failing with the development of a sarcoma uteri. After the operation her general condition improved steadily, her strength returned, and she was enabled to resume her usual duties in the enjoyment of good health. Such uterine pains as had existed before disappeared, or at least diminished; among others, a not infrequent neurotic reflex, a pain in the heel and ankle. This well-being was of short duration, although her physical condition seemed perfect, the pelvic viscera in a most satisfactory state—no cicatrization, induration, irritation, or tenderness, not even a scar visible. Certain of the reflexes, the hystero-neuroses, which had existed before the operation, and had temporarily disappeared after the removal of the uterus, returned, and increased rapidly to an intensity hitherto unknown: the pains in the heel and ankle were so severe as to interfere with her duties, and at times even to prevent walking or standing altogether; and, what appears still more strange, other characteristic uterine reflexes, which the patient had not known hitherto, made their appearance and attained unusual intensity, especially a burning heat in the top of the head.

As before stated, her previous attendant had exhausted all efforts, and, failing to afford relief, referred his patient as a hopeless case to the nerve department of the Polyclinie. Professor Hermann treated the affected parts, applying the sedative qualities of the electric current to the top of the head and to the feet. Now, mark the result: temporary

<sup>1</sup> "Genital Reflex Neuroses in the Female," *American Journal of Obstetrics*, vol. xvi., Nos. 1 and 2, 1883.

improvement followed, the patient experienced relief for some hours after the application, but invariably her pains returned, and she was obliged to seek relief again in renewed treatment, being at least able to walk since under Prof. Hermann's care.

I accidentally entered Dr. H.'s clinic whilst this patient was under treatment, and as the doctor briefly recounted her history, and the fact that uterus and ovaries, which I had presumed to be the cause of her suffering, had been removed, I nevertheless desired to see the patient, and Dr. H. kindly transferred her to my care. Vaginal canal and pelvic tissues seemed to be in good condition, but as I looked upon the distressing symptoms as uterine reflexes, a corresponding treatment was accordingly inaugurated. Positive vagino-abdominal galvanism was applied, 20 milliampères for four minutes, with the median plate as negative pole on the abdomen. This treatment, directed to the irritated uterine nerves precisely as if the organ had been still in place, gave greater relief than all applications heretofore, and after the third séance the pains and burning in the head and the agonizing pains in the heels had almost completely disappeared. The pain was similar to that which the old rheumatic experiences in the toe of an amputated leg long after the member has been removed, with the exception that the former is a reflex, the latter a direct, sensation emanating from the nerve-stump.

The case is one of the most striking I have seen, and affords the most incontrovertible evidence of the continuance of reflex symptoms after removal of the exciting cause, and the dependence, in this case at least, of the reflex upon a morbid irritability of the uterine nerve-fibres, as proven by the treatment: in others such continuance may be due to hyperactivity or hyperæsthesia of the ganglia or nerve-terminals in the corresponding organ, as is especially the case in the eye.

The result of the various treatments employed is characteristic of the therapy called for in genito-reflex neuroses: 1, treatment of the symptom is useless; 2, sedative applications to the nerve-fibres at the distal terminus, at the site of the symptom, may afford temporary relief; 3, a cure can be effected only by removing the cause or by sedative action upon the causative uterine terminals.

## V. CAUSE.

The exciting cause of genito-reflex neuroses is to be sought, I believe, in an irritation of the terminal nerves which is communicated to connecting fibres of the ganglionic or spinal nerves, and thus conveyed to the responding organ. Possibly the reflex irritation may be due to pressure upon the nerve-terminations within the uterine or ovarian tissue, caused by congestion, or to the distension of the peritoneal



covering by the enlargement of the organ. Either of these theories would seem plausible when we consider the coexistence of the reflex symptoms and the uterine engorgement preceding the flow, which is especially marked in uterine flexions and in chronic inflammations: the neurosis frequently appears two or three days before the menstrual flow, during the period of engorgement; it may cease during the continuance of the flow, to reappear for several days after its cessation. Under ordinary circumstances the uterine engorgement is relieved by the flow from the congested capillaries, and the reflex symptoms disappear, but when the catamenial discharge has been checked by local or general changes, disturbed menstruation, amenorrhœa, this means of escape is not afforded and the neurosis continues. A violent asthmatic attack is caused by a flexion of the uterus, and ceases within fifteen minutes after this flexion is overcome; the circulation is restored, but the congestion can be but little reduced in that time. The symptoms may result from the pressure upon the nerve-terminals in the fundus by reason of the congestion following the obstruction of the venous circulation, or, what appears more likely in this particular case, it may be due mechanically to pressure in the angle itself. In physiological as well as in pathological conditions we may expect pressure upon nerve-terminals from congestion or hypertrophy of tissue at puberty, during menstruation and pregnancy, at the menopause, and in disease; this may occur during the fluctuations in circulation previous to the final depletion, and when this occurs the reflex symptoms disappear.

Tilt refers reflex symptoms mainly to the ovary, likewise Hegar—especially Schroeder, who urges the performance of oöphorectomy for the relief of violent reflex symptoms, even, as he states, if disease of the ovarian tissues cannot be detected. The uterus he ignores, and yet the great mass of cases which I have described as hystero-neuroses, and proven to be such by their disappearance upon treatment of the uterine disease, were mostly referable to the uterus, few to the ovaries. However great the influence which the ovary is generally supposed to exert upon the entire system, especially the nervous organization of women, my study of the hystero-neuroses has proven most conclusively that the importance of the ovary in this respect has been over-estimated, and that it is the uterus in which the controlling influence centres.

## VI. DIAGNOSIS.

The differential diagnosis between the pathological state and a reflex neurosis, however simple it may appear to distinguish between disease and the mere semblance of disease, is not always easy. The afflicted

organ in which the reflex neurosis appears will be found in a perfectly healthy condition, with no structural changes, yet the symptoms of disease are so well portrayed that the most expert will be deceived, as the structural changes, often slight even in disease, cannot always be readily observed. Only the transparent structure of the eye admits of ready differentiation; in other tissues it is often impossible to distinguish between slight inflammation and a distension of the capillaries due to vaso-motor paralysis; and many of the vaso-motor reflexes present all the features of the disease proper. The difficulty of diagnosis culminates in the dermatoses in which phantom and disease blend; the reflex symptom presents even the structural changes of the disease, which is possibly itself only a vaso-motor effect.

It is the existence of neurosis or disease which must be determined: the link by which this is effected, however interesting from a scientific point, is of no importance to the practitioner. It is for him to determine the absence of structural changes in the functionally deranged organ, in order that he may not annoy his patient by injudicious medication, and to detect the immediate cause of the disturbance, in order that he may discover the morbid condition, perhaps otherwise not indicated, and by properly-directed treatment relieve the reflex symptoms as well as the local disease in the causative organ.

The existence of neuroses can of course be determined by the absence of structural changes in the afflicted part, but this is not always possible; we must resort to other means.

1. *A neurosis is probable and may be suspected—*

*a*, by the existence of violent symptoms without corresponding pathological changes or febrile reaction;

*b*, by the existence of lesions, uterine or ovarian;

*c*, by the failure of proper remedies to afford relief;

*d*, by the aggravation of symptoms in the afflicted organ corresponding to exacerbation of uterine disease.

2. *A neurosis is proven—*

*a*, if the symptoms are not aggravated by causes which are known to aggravate existing pathological changes in the organ affected. Thus the use of indigestible food will not aggravate a gastric neurosis, whilst the most violent symptoms may appear in response to a diet which would seem indicated in disease proper;

*b*, if the symptoms are aggravated by causes from which exacerbation of uterine disease may be expected;

*c*, improvement of symptoms upon treatment of uterine or ovarian disease regardless of any interference with the organ in which the neurosis appears;

*d*, by a cessation of symptoms upon improvement or cure of uterine disease.

## VII. TREATMENT.

The treatment of the hystero-neuroses may be—

*a*, Curative: by the treatment of the causative disease; and

*b*, Palliative: by the use of nervines and sedatives, or the direct action of electricity upon the irritated nerve-tract.

*a*. The diagnosis established, the most satisfactory and correct treatment of a reflex neurosis, however violent, is the treatment of the causative uterine disease regardless of the neurotic symptoms. Mild remedies to mitigate the severity of the symptoms may be employed, but permanent relief or cure cannot be expected until efficient treatment of the causative disease is inaugurated. The neurosis may disappear after a few treatments with but slight amelioration of the genital trouble, or it may continue until an approximately normal condition is established.

*b*. A reflex neurosis may be relieved, and even overcome, by the administration of nervines and sedatives and by the use of electricity—by the sedative influence of the current upon the irritated uterine terminals; and, although this is by no means a method upon which reliance can invariably be placed, it is worthy of trial. Violent symptoms, such as bronchial or gastric reflexes, may yield to the bromides, but unless a successful treatment of the uterine lesion accompany this medication, a relapse is liable to occur. Since I have observed the instantaneous disappearance of persistent neuroses under the galvanic treatment of uterine or ovarian affections, I have repeatedly and successfully attempted their treatment by electric application to the uterine terminals; and I can say that if it be of importance to relieve the neurosis as speedily as possible, this should be attempted, and, as uterine treatment is inaugurated, the sedative action of the current should be applied to the nerve-fibres in the causative organ.

The morning sickness of pregnancy still resists the persistent efforts of medical science, for the simple reason that medication is persistently directed to the affected organ, and the phantom of disease is persistently plied with all the weapons from the great arsenal of our materia medica. Even in this simple case the strict causative relation of the reflex symptom to the uterine condition is rejected. Like all reflex neuroses, the morning sickness, and often the violent vomiting of pregnancy, yield readily and positively to local treatment. If it be a pathological neurosis, originating in a congested condition of the cervix, an erosion, or an endocervicitis, it will yield readily to treatment; if it be a physiological neurosis due to distension of the uterus, a scarification may prove efficient; but to a certainty this symptom will yield to an evacuation of the uterine cavity. We have no better example than the gastric neurosis of pregnancy for guidance

in treatment of the hystero-neuroses: relief of the most violent vomiting may be obtained by a single application of carbolic acid to the cervical canal or of a tamponed tampon to the eroded cervix. It may not yield at once, a prolonged treatment of the local lesion may be necessary, but the symptoms are mitigated as local improvement is obtained. Heroic medication of the stomach is not only useless, but injurious. Nervines and sedatives may afford relief, not by medication of the gastric mucosa, but by allaying the reflex irritability of the nervous system. A complete deadening of the gastric nerves by cocaine will, as a rule, afford only temporary relief, whilst this astringent sedative applied to the cervix is more likely to attain the desired result. It is by action on the uterine terminals that the rebellious stomach must be quieted, and not through the gastric nerves. If gastric medication were abandoned and uterine treatment inaugurated, little difficulty would be experienced with this frequent and annoying symptom, which the obstetrician is glad to escape; so much so that in one of the latest and most able works the author advises the physician "to send the patient to her mother;" in other words, get her out of the way and don't attempt treatment; and Lusk takes the same view of the subject. Cure is certain, but through the uterus only, and if other means fail premature labor must be inaugurated. Gastric medication as an adjuvant is not contraindicated, but violent treatment of the stomach must be condemned as useless and ruinous.

Schroeder advises the removal of the ovary, notwithstanding the absence of structural changes, for the relief of these perplexing reflex symptoms. It is now, however, generally accepted that removal of the ovaries is only admissible after all efforts at treatment have failed, and, let me add, after the sedative action of galvanism has been tried. But as the cause is by no means in the ovaries alone, the patient cannot be certain of relief even after she has made this sacrifice and has risked her life upon the assurance of her physician that oöphorectomy was her only hope. The uterus is more liable to influence the system and to determine nerve-reflexes than the ovary: this position has been proven by those cases in which suffering continued after removal of these organs; and because the neurosis in other cases has abated in course of time, the advocates of this course claim justification. I believe that relief may be so obtained, though the causative lesion is uterine, and not ovarian, as the *indirect* effect of oöphorectomy; involution follows this operation, a lessening of the uterine impulse results, and hence we may expect relief, though the ovary itself is not directly causative.



## VIII. PROGNOSIS.

The prognosis in a hystero-neurosis, however violent, is favorable, as a rule, though it is impossible to predict with certainty. Until the immediate cause, the local nerve-lesion, is revealed, the prognosis is shrouded in mystery and can be told by the result only. At times relief of the most violent symptoms is sudden, the result of a trifling interference, without any very apparent improvement in the local condition: a single astringent application, a rectification of position, may cause the most annoying symptoms to vanish. Again, it is slow, coming only with visible improvement in the uterine condition. I have seen the most distressing epileptiform attacks cease instantaneously upon a dilatation of the uterine canal; a persistent melancholia with excessive nervous irritability yield within a few hours after the closing of a lacerated cervix; even a sallow, sickly hue of the face, which had persisted for years, changed within a few days to a fresh, bright complexion after a conical excision of the cervix for the relief of laceration and hyperplasia. The vomiting of pregnancy, which had emaciated the sufferer to the last degree, ceased upon the application of the tannated tampon; likewise, a pessary or a tampon properly applied will produce an immediate response in lung, heart, or brain. I have seen an agonizing asthma cease shortly after the placing of a pessary, intense cardiac pains and insomnia vanish upon the insertion of a tampon, and a single application of electricity cause a violent dyspnoea with great nervous depression to disappear, even during the application, whilst the patient was still upon the table, though haunted by suffering and reduced to invalidism for over two years. Again, the improvement comes but slowly with restoration of a healthy condition of uterus and ovaries; or, if it has existed for any length of time, the neurosis may abate but slowly, to cease long after the local lesion has been overcome. This is especially noticeable in those neuroses and psychoses resulting from laceration of the cervix and its sequences; as after oöphorectomy the neurosis may not disappear until many months subsequent to the performance of Emmet's operation; but, as a rule, unless it has been most violent in character and has continued for a long term of years, complete restoration of healthy functional action and permanent relief may be expected upon proper treatment of the causative uterine lesion. If the neurosis has been severe and long continued, a weakness of the nerves implicated may remain and the morbid action of the governing ganglia, so long continued, may be perpetuated. In a case of gastric neurosis which had continued for eight years I was astonished to find the stomach in a fairly healthy condition, notwithstanding eight years of medication and diet and the constitutional debility of the patient. A certain weakness may

be expected to remain in those cases, and in some a perverted nerve-action is likewise perpetuated. Even violent psychoses, such as mania, melancholia, and epilepsy, will disappear completely upon relief of the uterine lesion, but the reflex neuroses of the eye offer a less favorable prognosis: if continued for a length of time a weakness of that important organ is likely to remain, and in certain forms of ophthalmic neurosis, though of short duration, functional changes are perpetuated. With this exception the prognosis of the reflex disturbances referable to the female reproductive organs is an excellent one, provided the part be not abused by misdirected treatment and the efforts of the practitioner centre upon the causative genital condition.

## PART II.—SPECIAL.

### HYSTERO-NEUROSES OF INDIVIDUAL ORGANS.—THE VARIOUS REFLEX FUNCTIONAL DISTURBANCES REFERABLE TO THE FEMALE SEXUAL APPARATUS.

#### I. NERVOUS SYSTEM.

THE impressionable nervous system of woman is the most susceptible of all organs and responds most readily to peripheral irritation, and every vibration of the nerve-fluid in the genital terminals meets with a sympathetic reverberation, and is often re-echoed a hundred-fold, in the spinal and cerebral centres, which reflect even the physiological action of the reproductive organs. During the entire period of female sexual life variations of any kind in these great centres, in which the functional life of woman is concentrated, evoke a ready response in the nervous system. So intimately are these two most potent factors of the female organism linked that, whilst the nervous system signalizes uterine and ovarian changes, the sexual organs respond readily to central vibrations: nervous debility is marked by leucorrhœa and uterine pains; powerful nerve-impressions, by hemorrhage or cessation of the physiological flow.

Perverted action of the nervous system, which appears as a reflex symptom in response to a morbid uterine or ovarian stimulus, may be either central, on the part of the brain, or peripheral, on the part of the spinal nerves. The peripheral neuroses or nerve-pains are more common as constant or pathological neuroses referable to uterine or ovarian disease; whilst the central neuroses, psychoses, more frequently signalize physiological waves, and result from the powerful impressions made by the great epochs in the functional life of woman—puberty, menstruation, parturition, and the menopause.

1. *The Brain ; Cerebral Hystero-neuroses or Hystero-psychoses.*

Uterine or ovarian disease is frequently characterized by nerve-depression or irritability, loss of memory, insomnia or uncontrollable desire for sleep in the daytime, vague fear of misfortune, and dread of insanity. These are the mildest and most common of the central reflexes. Perversions of the moral sense, epileptiform attacks, melancholia, and mania are the more severe forms which are referable to the physiological changes, menstruation, parturition, and the menopause. It is difficult to draw the line between ganglionic reflexes and true cerebral symptoms. The neuroses present so true a fac-simile of the diseases which they simulate that the differential diagnosis is difficult. Continued observation or treatment, the recurrence of an attack with each menstrual period, or the improvement of the condition upon the inauguration of uterine treatment, indicates that it is a reflex symptom, a neurosis, and that all therapeutic efforts must be directed toward the relief of the uterine disease. I must emphasize that I confine myself exclusively to those symptoms which are proven to be strictly dependent upon uterine or ovarian irritation and respond to changes in these parts as readily as the electric bell does to pressure upon a distant button. These psychoses, though presenting a complete perversion of moral and mental faculties, are distinguished from the true central lesion by the favorable prognosis of the one and the dark future of the other: whilst the reflex symptoms readily yield to proper uterine treatment, the true psychosis is of a much more serious nature. Whilst the fact has always been appreciated that a certain relation exists between the impressionable mind of woman and the reproductive organs, whilst it has been well known that the diseases of the mind in their development and in their various phases are closely connected with the vibrations of sexual life, but little positive evidence has been introduced as to the direct dependence of the mental state upon the uterine condition; much less have those forms of insanity been defined which are mere reflections of functional derangement or of disease and malposition of the womb. I must say, as I did in my first paper on the hystero-neuroses, that the causative connection, though vaguely evident, has as yet been distinctly defined by only a few.

Alienists have always acknowledged an influence of the sexual organs upon the mental functions—all works on insanity bear evidence of this—but the statements made are generally very vague; thus Bucknill, Tuke, Esquirol, and others cite those frequent cases of sexual excitement and the disgusting exhibitions of many insane patients as instances of the dependence of mental derangements upon disorders of the sexual organs.

Such cases may be entirely excluded, as venereal excitement is not

only not an indication, but even a rare concomitant, of the hysteropsychoses. Other alienists, however, relate well-marked cases which distinctly show the causative connection, and insist on the importance of uterine examinations in the treatment of the insane.

Esquirol refers to the frequent exacerbations of mental disease, its occurrence and recurrence at the period of functional activity in the reproductive organs; yet he does not appear to appreciate the immediate causative relation, and certainly does not limit his treatment to the treatment of the uterine state. Gynecological textbooks give us but little information upon this point. Our earliest knowledge we owe to Louis Mayer<sup>1</sup> of Berlin, Fordyce Barker of New York, and Horatio Storer<sup>2</sup> of Boston, but within the last decade both gynecologists and alienists have been attracted to the intricacy and importance of these peculiar phenomena: from the great number of striking but still unexplained observations we shall soon be able to determine with greater certainty the extent of the influence exerted by genital changes upon the mental state; and the accumulated evidence indicates an undoubted causative dependence in certain cases. But among the numerous publications which have resulted I must note one on account of the peculiar position taken: *Gynecology, Neuroses, and Psychoses: A Protest against Reckless Gynecological Treatment for Nervous Disorders*, by L. Bremer, M. D. Does it not appear strange that an alienist should complain of the enervation of the gynecologist, as injury can be done only by an ignoring of the reproductive organs? If uterine disease should exist as a concomitant of mental aberration, local treatment of the existing disease is unquestionably indicated, whether the psychosis be in any way dependent upon it or not; if a morbid condition of the reproductive organs exists, this must be relieved, whatever its relation be to the mental disturbance; and should the latter be a resultant reflex symptom, the only possible correct course has been taken. No harm can be done by the uterine treatment, and, though there be no direct causative relation, the mental disturbance will often improve, as it does with the improvement of any functional derangement, as an exacerbation takes place during the period of uterine congestion during menstruation or pregnancy, though there be no direct causative connection. But the alienist who overlooks a causative local lesion and treats a reflex symptom as a true psychosis does his patient a criminal wrong. It is perhaps a difficult task to eliminate the hysteropsychoses proper, those cases of mental alienation which have been proven to be dependent upon and caused by uterine disease: if they are not rare, they are at least little known as yet, and will remain so until uterine examination

<sup>1</sup> *Die Beziehungen der Krankhaften Zustände und Vorgänge in den Sexual-Organen des Weibes zu Geistesstörungen*, Berlin, 1869.

<sup>2</sup> *The Course and Treatment of Reflex Insanity in Women*.



and therapeutics become an acknowledged factor in the treatment of the insane; the relation can be established with certainty by the crucial test of treatment only. The nervous system and the reproductive organs, these two governing centres of female life, co-respond even when not in direct causative relation. A sympathy exists, as it is marked by the exacerbation of mental disease with pregnancy, menstruation, and the menopause; hence it is difficult, if not impossible, to determine fully the precise relationship, and to differentiate between direct causative connection and mere correspondence or sympathetic exacerbation.

Uterine disease may accompany the mental affection, and yet in no way influence its course; and, again, morbid brain-action may be the causative element which produces irregularities in the functional activity of the sexual organs.

The labors of Schroeder in this direction deserve to be better known. He has carefully observed two hundred and twelve female patients during a six years' service in a well-regulated insane asylum, and finds the large majority of these women afflicted with menstrual irregularities.

When menstruation was normal, he found the mental aberration but trifling; incipient mental derangement was generally accompanied by the appearance of some abnormality of the previously regular catamenia, which became more patent as the insanity developed; but in no instance was the patient restored by regulating the menstrual flow.

The author makes the existence of a certain sympathetic relation between these organs very evident, but in his cases the menstrual derangements seem to be secondary to and dependent upon the psychoses.

CLASSIFICATION.—Whilst we may classify the hystero-psychoses, like all of the neuroses, as constant or pathological, those due to morbid conditions on the one hand, and on the other those accompanying the physiological states of puberty, menstruation, parturition, and the menopause, it is true of this group, as it is of all hystero-neuroses, that the impression is often referable to a pathological condition more or less marked to which the nervous system has accommodated itself, and hence it responds only to the exacerbation of this pathological state by the additional impulse of the physiological congestion. The indications for the treatment are correspondingly well defined—a search for the existing uterine deviation, and relief, or at least relief of the temporary congestion, and if this prove ineffectual a systematic quieting of the uterine nerve-terminals, by the galvanic current. I cannot refer certain of the mental conditions to certain uterine or ovarian lesions, though one period seems to tend more to the development of one psychosis than another. But if a weakness exists, a tendency to a certain form of cerebral disturbance, this will be developed by a morbid intensification of the uterine stimulus, and, though it be allayed and a healthy

action restored, the chain is established, and the return of genital irritation at however late a period will be marked by the same cerebral response. The woman who in childhood has been affected with chorea may expect a return of the disease with the advent of puberty or of pregnancy if her nervous system be in a sensitive state or a pathological variation accompany the physiological congestion of the sexual organs. A psychosis which has appeared at puberty may be looked for as an accompaniment of the menstrual congestion or the menopause at any time that conditions exist which favor a morbid hyperactivity. The intense nervous excitement of menstruation may develop into maniacal symptoms with the increased congestion of pregnancy. I have seen symptoms of melancholia develop with the advent of puberty in a girl, who had inherited an excessively sensitive nervous system, which had caused her much annoyance in childhood; I have seen both melancholia and mania developing in one parturition repeated at the next; but, what is more sad, a maniacal attack which had persisted for three months at puberty, and had left the mind of the sufferer free throughout all her functional life, returns at the menopause, and under peculiarly unfavorable external conditions is threatening to become permanent. Had the surroundings been favorable, as they were at the time of puberty, I am sure that this second attack would have passed off as readily as the first.

I can but quote the words of Fordyce Barker in speaking of those cases of insanity which are developed immediately after marriage as the most pitiable of all the conditions under which insanity is developed, as a reflex irritation of the brain from disease of the sexual organs; and here again I recall such recurrence in a bright, healthy, happy bride of an attack of melancholia to which she had been a victim during two months at the time of puberty: with the first nuptial embrace the cloud which had been lifted again settled down upon her.

**SYMPTOMS.**—Mental and nervous phases which reflect a morbid state of uterus or ovaries well known to every physician are the nervous prostration and mental depression and irritability which form so common an accompaniment of pelvic disease and are so indicative of functional changes. Tilt found these conditions in 459 out of 500 of the patients examined by him for irregularities at the menopause. This lack of energy, listlessness, nervous depression, as well as excessive irritability, are perhaps the most frequent of the mental reflexes: then come the loss of memory; insomnia or an irresistible desire for sleep during the daytime; a depressing fear of something terrible about to happen: a dread of insanity, a frequent resultant from uterine disease, is also one of the most common psychoses of pregnancy, and a sad burden to the young wife, who, oppressed with the vague fear of death, instead of looking forward with joy to a happy future, is in tears, depressed,

certain of a fatal termination of the expected labor. Complete change of the mental, and even the moral, state is a reflex common alike to disease and physiological changes: a girl with a bright, happy disposition becomes depressed, downcast with the advent of puberty, to resume her natural cheerfulness when the menses have been fully established; an amiable, cheerful woman becomes discouraged, dissatisfied, believes herself deceived by her friends, offends and insults those nearest and dearest to her during the exacerbation of uterine disease by the menstrual congestion; a bright disposition yields to peevishness or melancholia through disease or the physiological changes of pregnancy or the menopause. The more intense psychoses, deep-seated melancholia and mania, are more liable to reflect the intense physiological changes of parturition, puberty, or the menopause, and these intense morbid delusions find expression in suicidal attempts or murderous attacks upon a newborn infant. Delusions are often referable to pathological changes, but become more marked by the increased stimulus of menstruation or other physiological congestions; hence they are more frequently referred to these conditions than to their true cause, the pathological change in the reproductive organs. We are guided in our diagnosis of a hemiplegia or a paraplegia, reflex in its nature, by the fact that the disease proper is most liable to occur in old age, whilst the symptoms as a reflex psychosis appear most commonly in the young. In the male child it is almost a characteristic mark of the adherent prepuce, while in infants of both sexes it may appear as the result of intestinal irritation; and again we see these symptoms at puberty until a healthy functional activity of the reproductive organs is established. Like chorea, aphonia, lameness of the limbs on one side, more or less marked hemiplegia or paraplegia, but most commonly the former, is found most frequently during the period of development: numbness, tingling of the extremities, especially the fingers, are more likely to appear as an evidence of disease. Among these psychoses are the maniacal attacks which reflect the intense genital stimulus of marriage and parturition; the melancholia of puberty, the thoughts of death which haunt the expectant mother, and the mental and moral perversions so frequently accompanying uterine disease, but characteristic as well of the inauguration of woman's sexual life and the terminal period, during which love is changed to hate, a kind, gentle disposition to one that is treacherous and malevolent. Tilt has already told us that much domestic unhappiness is due to morbid uterine stimulus, as an ugly disposition takes the place of one heretofore passive and gentle; the kindly mother grows indifferent to her child; the thrifty housekeeper appears as a spendthrift: in short, the good qualities are perverted, and such evil impulses as may have lain dormant take full possession of the unfortunate victim.

I have cited only such of the psychoses as I have myself observed,

and, as is but natural, these are the less violent: the more intense are referred to the alienists; and, unfortunately, notwithstanding all that has been written, the full importance of these reflexes is by no means sufficiently appreciated by them, and patients who are brought to the asylum or to the specialist with maniacal attacks or the more marked forms of mental disturbances are treated for the disease which is so closely copied by the reflex phantom. The full bearing of the reflex irritation is not acknowledged, and they are dosed with nervines, whilst the speeulum, by which the causative disease may be so easily relieved, is not thought of. Hence, with the exception of puerperal mania and those comparatively rare attacks which occur whilst the patient is under the care of gynecologists, those who suffer from this phantom disease are merged with the great mass of the insane or the mentally afflicted, and, notwithstanding the observations and the writings of such keen observers as Esquirol, Mayer, and others, who constantly call attention to the undulations of mental symptoms with the functional waves of reproductive life, the positive dependence is not established; hence the key to the relief of the fettered mind is not yet found, and it is impossible to say how frequent are the more violent of the reflex psychoses.

Violent epileptiform attacks, among the most intense of the reflex symptoms, and, as a rule, referable to pathological conditions, occur also during pregnancy and menstruation, and are even then referable to some pathological change in the uterus.

CASE V. *Aphonia, Chorea, and Hemiplegia, due to Amenorrhœa during the Advent of Puberty.*—Miss X——, from Buffalo, who had suffered from a light attack of chorea minor during early childhood, was brought to me with many of the symptoms of hemiplegia, a beginning return of chorea, and an aphonia which was complete for hours at a time.

An unusually sweet and amiable child, an only daughter, having been treated for several months without benefit, her mother was in great distress; the diagnosis, however, was simple: the girl in her fourteenth year had grown rapidly and was fast developing into womanhood; her figure was developing; a faint flow had appeared several times at irregular intervals; and the symptoms varied greatly in intensity with the most complete semblance of disease when under the influence of the emotions or after bodily exertion. The movements of the tongue were at all times imperfect, but when tired or excited by an unexpected noise or the sudden entry of a visitor the aphonia was complete. At times the limbs relaxed as if paralyzed; at times they twitched under the uncontrollable tremor of chorea. She had been treated for several months with such remedies as are usual in cases of chorea, and, as is so commonly done with young girls suffering



with the symptoms, direct or indirect, of uterine disease, she was urged to take exercise in the earlier stages of the disease, to ride, to see as much company as possible; that is, mind and body, which needed rest, were forced to exertion, and the irritation of the sexual organs was increased. I looked upon the symptoms as purely of a reflex nature; and they were proven to be so by the good result of the treatment directed only to the establishing of the menstrual function: abdominal and spino-abdominal faradism was applied, as I believed it right to attempt this, and not to inaugurate a direct uterine treatment unless absolutely necessary; at the same time the current was applied to the spinal column, the cervical nerves, and to the neck. But although this may have afforded relief, the cure is unquestionably due to the development of a healthy menstrual function by abdomino-spinal faradism. Within six weeks the young lady left for her home with full control of all her muscles, the menstrual flow free, without a trace of the symptoms but a short time ago so threatening.

CASE VI. *Left Hemiplegia, Partial Aphonia, Choking Sensations, Tingling of the Extremities, Mental Depression, due to Amenorrhœa during Puberty.*—Miss L——, from Alabama, a young lady of 16, of good figure, but imperfectly developed: the case was similar to the last, the chorea of the one being replaced by a hemiplegia, at times well marked, in the other. Although the amenorrhœa might have been referable to chlorosis, the existence of an endoervicitis and slight endometritis, with aggravated virginal ante flexion, rendered the dependence of the distressing reflex symptoms upon morbid uterine conditions more plausible, and the retarded development seemed referable rather to the disturbance in the genitalia. The correctness of the diagnosis was soon verified by the result of local treatment: utero-abdominal faradism, vagino-abdominal faradism for the purpose of stimulating functional activity of the uterus and ovaries, and negative utero-abdominal galvanism, with currents of 15 to 25 m. a. (5 minutes, cotton-wrapped applicator as negative pole in utero, medium plate as positive pole on abdomen over fundus, 9 volts), as a direct uterine stimulus, and a mild alterative application to the lining membrane: tonics were also given. After the second treatment the menstrual flow appeared, the first in the past six months, and with it came an amelioration of all the symptoms: heaviness of the tongue and hemiplegia disappeared; choking sensations, tingling in the extremities, though lessened, still persisted, and yielded but slowly during the six weeks' treatment, disappearing with the endoervicitis. The cure of the slight uterine abnormality, the improvement in the circulation of the pelvic viscera, first marked by the coming of the menstrual flow, seemed as by a sudden impulse to stimulate retarded development, and this girl, in whom the period of puberty had so long continued, bloomed forth

all at once, and the child that came returned to her home a woman, as her mother wrote to me.

In this case the symptoms were in part due to imperfect functional activity, in part to morbid conditions; the more marked psychoses, melancholia and hemiplegia, yielded at once with the appearance of the monthly flow, whilst the tingling of the extremities and choking sensations, being dependent upon the endocervicitis, resisted until this had been relieved.

CASE VII. *Menstrual Psychosis; Melancholia with maniacal attacks accompanying the menstrual congestion, continuing for ten days, returning regularly with each period after the first appearance of the psychosis immediately after marriage; Uterus duplex, retroversion, endometritis, partition of the vaginal canal; Treatment of the local lesion regardless of the mental symptoms; Cure.*—Mrs. K——, from Illinois, farmer's wife, 24 years of age; strong, of good constitution, and well developed; can recall no symptoms in her earlier life indicative of uterine or mental disturbance with the exception of slight menstrual pains. Consummation of the marital rights was followed by an attack of melancholia, a strangely-changed mental condition; and this attack returned with each menstruation, continuing for a period of from eight to ten, and sometimes fourteen, days; she was depressed, sad, the symptoms as described by her husband giving evidence of well-marked melancholia. She seemed to attend mechanically to the more necessary household duties, being perfectly rational in the brief intermenstrual period, in full control of her mental faculties, willing and able to attend to her work: to all appearances in perfect health and sound in mind. During the last months her melancholia, this reflex menstrual psychosis, began to assume a more threatening aspect, taking the form of low maniacal attacks: the usual treatment had been inaugurated, the attending physician evidently regarding the case as one of mental aberration. Dr. Binney of Mount Olive, Illinois, being consulted, was at once led to suspect the reflex nature of the disease by reason of the monthly recurrence and its development at the time of marriage, the local lesion being indicated by the existence of spinal and hypogastric pains; hence he referred the patient to me.

January 13, 1887, I saw this lady for the first time: examination revealed a uterus duplex, both fundi enlarged, on the floor of the pelvis, retroflexed and retroverted; the external os and cervical canal in each very narrow and the endometrium diseased. Treatment, however, was impossible until the vaginal septum had been removed, as it rendered the organ on the left inaccessible. January 14th the vaginal septum was excised under antiseptic precautions, and the electro-cauterization of the cavities of both uteri undertaken: the negative pole, a delicate copper probe, with a current of 50 m. a., was applied to the endo-

metrium, and after this the largest possible instrument, an ordinary sound, was introduced into the cervical canal with a current of 100 m. a. for three minutes, and forced toward the internal os for the purpose of dilatation. The bowels had been thoroughly evacuated, the parts were dusted with iodoform, the fundus was elevated with the elastic tampon, and the patient instructed to lie in the semiprone position; before the wound had healed, and before further treatment was possible, the menstrual flow came on without any of the usual accompaniments, without any untoward symptoms, direct or reflex; the patient was comfortable and quite rational, perfectly quiet, not even nervous, her eyes clear and bright. During the following intermenstrual period she remained in the hospital department of the Polyclinic and treatment was continued—galvanism, negative electro-cauterization of the endometrium, with mild astringent applications, and the elastic tampon to overcome the displacement.

Mrs. K—— proved one of the most satisfactory patients we have had under treatment: careful in obeying instructions, quiet and clear-headed, entirely free from the annoying nervousness so common to uterine disease, the local condition rapidly improved: a second menstrual period passed off without the slightest evidence of any irregularity, either direct or reflex, uterine or cerebral. The patient was not dismissed, however, as I desired to keep her under observation until a perfectly normal condition of the pelvic viscera was attained. Devotedly attached to her husband, she gave way to an intense home-sickness against which she had long struggled; daily she grew more anxious to return to her home, and this intense anxiety culminated in a relapse into that state of melancholia which had previously been the accompaniment of the menstrual congestion. Her husband was telegraphed for, but before he arrived reason had fled.

In this patient the severe nervous strain, which in others would have led to irritability, exacerbation of local or general symptoms, resulted in a return of the melancholia, which heretofore had appeared only in response to the morbid uterine stimulus when intensified by the menstrual congestion. The force of the uterine irritation had been allayed by improvement in the existing morbid condition, so that it proved powerless to evolve a response even under the heightened pressure of the menstrual excitement; but the tension of the nervous system, strained to the utmost, was such that it proved unable to resist the influence of even the greatly diminished local irritation: before, it had been the stronger pressure upon the trigger which caused the explosion, now it was the weakening of the spring which forced it to yield to but trifling pressure. Believing that under favorable conditions no relapse would occur, I urged her immediate return home, as the cause of her trouble was evidently home-sickness: her condition was one of melan-

cholia tending to mania; unconscious of her surroundings, her eyes unsteady, without the light of reason, she recognized no one but her husband, for whom she constantly called, and whose momentary absence caused a wild despair. My diagnosis was verified; upon his coming and the promise of a speedy journey homeward she at once became quiet, and within a few days reason returned. Her health has been greatly improved; she no longer complains of pelvic pains, and several periods have passed without either local or reflex symptoms, with a mind clear and unruffled.

CASE VIII. *Violent Epileptiform Attacks during Pregnancy relieved by Cauterization of the Eroded Cervix.*<sup>1</sup>—Mrs. O——, aged 28, menstruated at the age of fifteen, married at twenty-four, has always been healthy; gave evidence of no hereditary taint; menstruation, perfectly normal before and after marriage, is never painful; has had one miscarriage, in the sixth week, soon after marriage; has since borne two children, the youngest of which is eighteen months old. A few weeks after the last confinement she first complained of that heaviness of the head with dizziness and languor from which she has suffered ever since, together with epileptiform attacks, which appeared at about the same time; at first in a very mild form, once or twice a month, as an oppression of the chest and a shortness of breath, which would pass away in the course of five or ten minutes. These attacks rapidly increased in frequency and in severity, always beginning in the same way, with a shortness of breath, with an oppression of the chest, a feeling of constriction; then twitching of the fingers with spasmodic closing of the hands, and she becomes unconscious; convulsive motions of the arms and opisthotonos follow. This is sometimes so intense that the heels almost touch the head, and the contraction of the dorsal muscles has been so sudden and so violent that the patient has hurled herself from the middle of the bed upon the floor by a single effort. During the attack, which lasts from ten to fifteen minutes, she is totally unconscious, the eyes closed, hands not firmly clenched, thumbs not turned in; then a state of relaxation follows. During the last month she was confined to her bed the attacks were severe and quite frequent, and her condition grew constantly more unbearable, notwithstanding the liberal use of chloral and bromide of potassium, which was properly prescribed by the physician in attendance. As the patient did not improve, Dr. H. Greiner was called in. He pursued a similar course of treatment, adding opium injections: by an oversight on the part of an attendant a teaspoonful of the strong tincture of opium was administered internally, but even this did not check the attacks, which appeared three or four times a day, continuing with great intensity from ten to fifteen minutes at a time.

<sup>1</sup> "An Hystero-psychosis," *St. Louis Clinical Record*, 1878.



March 18, 1878, I first saw Mrs. O—— in consultation with Dr. Greiner. We had hardly entered the room when her hands began to twitch nervously, her eyes closed, her head was plunged backward and buried in the bedding in violent opisthotonos. The spasm yielded for a moment, to return with increased severity, with violent contractions of the dorsal muscles, hurling the patient from one side to the other, so that she was with difficulty held down by the combined efforts of those about. After the attack, which had lasted twelve minutes, a stupor supervened. Her husband was constantly by her side, as in these convulsive contractions, by which she was bent almost into a circle, she was in danger at any moment of hurling herself from the bed, as if thrown from a spring-board, and it was only possible for her husband to prevent injury by holding her in his arms until the muscles relaxed, catching her as she bounded upward, head and heels almost in contact. Upon recovering she complained of dorsal and hypogastric pains and heaviness of the head, which had persisted for weeks with occasional nausea and vomiting, more particularly in the morning; the conjunctiva was slightly injected, the pupils normal, their reaction perfect, but slow; she had a dull, stupid look and was slow in her answers. The uterus was enlarged, the cervix lacerated, eroded, and congested, the erosion sensitive; one period had been missed. The eroded cervix was thoroughly cauterized with nitric acid and a glycerin cotton tampon with tannic acid was introduced into the vagina.

With the exception of a slight spasm on the evening of the 18th, the epileptiform attacks did not recur from the time of the application of the nitric acid until the 22d, notwithstanding the discontinuance of all sedatives. On the 24th the patient had a severe attack, for which Dr. Greiner was obliged to resort to chloroform: this was the last, but nausea and vomiting steadily increased, until on the 26th they had become most distressing; but these I looked upon as reflexes of pregnancy. A sponge tent was introduced in order to favor the expulsion of the ovum, which occurred on the 31st. I did not see the patient until two days later, and found her remarkably changed: her complexion was better; she had lost her pale, bleached appearance and distressed look; the vomiting had ceased with the dilatation of the canal and the expulsion of the ovum, and the epileptiform attacks had yielded instantaneously to the cauterization of the cervix, returning but once in a severe attack on the 24th. Two weeks after the miscarriage Mrs. O—— was attending to the lighter duties of the household, feeling more vigorous and more cheerful than she had at any time since the birth of her last child, to which the laceration and erosion are referable. In this case we have an hystero-epilepsy proper, in a most aggravated form, of sixteen months' duration, checked by a single application of nitric acid to the eroded cervix, and cured by the second. Coexisting are the nausea

and vomiting—the reflex gastero-neurosis of pregnancy—which yielded only to the dilatation of the canal, and was in no way affected by the cauterization which overcame the psychosis, the latter evidently referable to the erosion of the cervix, the former to the congestion of the muscular tissue or lining membrane.

Two years later I saw this patient under precisely similar circumstances, with the same terrible epileptiform attacks, but, though the symptoms abated after the same cervical application, they were in this second case not overcome until the canal had been dilated by the sponge tent, and complete recovery did not take place until after the expulsion of the ovum, proving the psychosis, which before had been referable to a morbid condition, the erosion of the cervix, in this instance to have been clearly dependent upon the pregnant state.

CASE IX. *Recurring Puerperal Melancholia*.—Mrs. X——, wife of a confrère, a healthy matron of 29, happy in all her surroundings, free from all evidence of pelvic disease, began to show symptoms of mental aberration in the second week of her first confinement: a local cause was sought for and remnants of placental tissue removed, yet no change took place. Constitutional treatment proved ineffective; local applications were not possible, on account of the condition of the patient, and not permitted by her; a deep melancholia, varied at times with maniacal attacks, followed, and not until involution had been completed did any improvement take place. With the restoration of a normal condition of the reproductive organs the mental faculties returned, and the patient continued in the best of health, robust in body, cheerful in mind.

Three years after this period conception again occurred: pregnancy was marred by no unfavorable symptoms, and labor progressed favorably; a healthy child was born, but within a few days a return of the same symptoms was threatened, and for two months the patient was guarded with the utmost care; no explosion occurred, yet she was constantly upon the verge of mental alienation, and not until involution had taken place did a healthy state return.

The case is an exceptionally well-defined example of a recurrent physiological reflex, the psychosis appearing during the puerperium independent of pathological conditions, and continuing throughout the entire period, notwithstanding all that the love of a devoted husband and the care of expert physicians and watchful nurses could do, and recurring with the return of similar physiological conditions, in a healthy body, with a healthy mind and healthy reproductive organs, notwithstanding the precautions taken to avert the expected and greatly dreaded condition.

CASE X. *Recurring Physiological Hysteropsychosis: Melancholia with Maniacal Attacks accompanying Puberty and the Menopause*.—Mrs.

K——, a bright, sunny girl in childhood, gave way to melancholia in her sixteenth year with the advent of puberty. For some three or four months she was in a state of religious mania, shrinking from contact with the world, fearful of hurt or accident, singing psalms and begging her family to join in her religious exercises: with full development of the menstrual function a normal mental condition returned. During an active life a healthy condition of mind and body was retained, even during menstruation and pregnancy, but as the menopause approached occasional attacks of a similar nature returned, as the patient was in a state of constant mental anxiety and haunted by fear in her domestic infelicity. Her marital relations were not happy; she was in great dread of her husband, who threatened and maltreated her, and with the cessation of the menses this condition became one of mania—at times in great fear of others, always expecting an accident, fearing, if her children were out at play, “that the trees would fall upon them or that the lightning would strike them;” above all, she was in dread of being buried alive. Religious conceptions gave color to her delusions, but in the main they were governed by fear of her husband, and the cruelty of the man, aggravated by his wife’s misfortune, led to bodily injury, which in her present mental state will, I fear, result in confirmed and permanent mania, whilst under more favorable circumstances, with a happy home-life, I am sure that this hystero-psychosis of cessation would have ceased as readily as did the first reflex at the time of puberty when the functional wave had died out: like the ship at sea upon which the tidal wave crushes down, she passes through the ordeal unscathed if her timbers are strong, but is wrecked if worm-eaten ribs compose her frame. This is a recurrent physiological reflex under adverse conditions, contrasting in this respect with the one previously cited.

CASE XI. *A Pathological Hystero-psychosis referable to a Retroflexion of the Uterus, first appearing after marriage, checked by the placing of a pessary and by reposition of the uterus.*—I cite this striking case from the practice of Dr. J. Cheston Morris of Philadelphia, who has kindly placed the history at my disposal: Mrs. G. W. L——, aged 40, had continued in good health, free from nervous or mental disturbance, until the appearance of the first epileptic attack three weeks after marriage. These attacks, at first mild, gradually increased in severity, and were followed by nausea, headache, and intense depression, so completely overcoming the sufferer that in the agony of each attack she despaired of living through another. Patient had been treated in various ways, and most heroically, under all the various theories of epilepsy, even to losing a number of sound teeth in hopes of curing a neuralgic condition of the superior maxillary branch of the fifth pair, which at one time was supposed to be accountable for this sad condition. Her

general health was fair; no uterine symptoms had been detected; the only child was eight years of age.<sup>1</sup>

When seen by Dr. Morris, fifteen years after the occurrence of the first attack, he found some retroversion and a small warty growth on the posterior lip: this was excised, the base touched with nitric acid, the uterine replaced, and a Hodge pessary inserted; a careful diet was prescribed, and bromide of potassium and Plummer's pills were given. With the removal of the growth and the reposition of the uterus these attacks suddenly ceased.

As the husband had kept strict account of his wife's terrible condition, we know that in those fifteen years she has had six hundred and fifty-one of these attacks. Six months after this one treatment and cure a single slight attack appeared, but since then—and four years have passed—the patient has continued in the enjoyment of perfect health.

This striking case, which so thoroughly demonstrates the direct causative relation between the psychoses and uterine disease, is but one of many I have observed and might record, and I will but refer briefly to another:

CASE XII. *Pathological Hystero-psychosis in a Virgin.*<sup>2</sup>—A robust, well-developed girl of 17, suffering from daily epileptiform attacks, was relieved by the cure of the causative erosion and endocervicitis. A single application of nitric acid to the cervix checked the attacks for five days, and complete relief was afforded by the cure of the endocervicitis by means of slippery-elm tents and occasional applications to the inflamed cervical mucosa. Whilst cauterization of the erosion lessened the violence of the reflex psychosis, it did not cease until the endocervicitis had been checked, and thereupon the pain disappeared, the head became clear, and the complexion improved.

Dr. Barker, in his memorable paper on "Uterine Disease as an Exciting Cause of Insanity,"<sup>3</sup> cites an equally characteristic case in which insanity was caused by a displacement of the uterus, and reposition of the extremely retroverted and enlarged organ was followed by immediate disappearance of the mental disturbance. To use his own words: "I found the uterus retroverted, packed down, so that it required some force to replace it. As soon as this was done she loudly ejaculated, with a kind of satisfied grunt, 'There, now!' and at once ceased spitting, became perfectly quiet, and before I left the room felt happy. On

<sup>1</sup> I quote the words of Dr. Morris, who himself records the opinion of the previous attendant, when he says that no uterine symptoms existed. Though no discomfort was complained of, and the patient may have been in the best of health, continued sterility after the birth of one child would lead us to suspect some serious lesion of the reproductive organs, most probably an injury of the uterus referable to the one confinement.

<sup>2</sup> "Case 2. The Hystero-neuroses," *Transactions American Gynecological Society*, 1878.

<sup>3</sup> *Journal of the Gynecological Society of Boston*, May, 1873, p. 347.



visiting her next morning I was surprised to see her sitting at the breakfast-table smiling and happy."

The above-described are true cases of hystero-epilepsy, at least what I would call so—epilepsy directly dependent upon uterine disease, a strictly genito-reflex psychosis, which is widely different from the hystero-epilepsy of Chareot and others marked by sexual hallucination, the insanity which is principally manifested by morbid cravings and sexual hallucinations and said by alienists to be pure exaltations. The insanity of old maids, though in connection with uterine or ovarian disease, has never been proven to be strictly a reflex hystero-psychosis or a hystero-epilepsy.

CASE XIII. *Melancholia and Nervous Irritability, due to Laceration of the Cervix, cured by Emmet's Operation.*—Mrs. S——, from Illinois, suffering from mental and physical prostration, great nervous depression, was referred to me on account of spinal and hypogastric pains. Her symptoms were sufficiently explained by a retroversion of the enlarged uterus, laceration of the cervix and perineum, metritis, and endometritis. Local treatment was inaugurated, and the subsequent improvement of the uterine lesion was accompanied by a corresponding improvement in the general health of the patient, while the mental condition remained unchanged.

The melancholia and nervous depression being in no way affected by the decided change in the uterine inflammation, I referred the psychosis to the laceration, and decided upon an operation; at the same sitting, the patient under the anæsthetic, the endometrium was curetted and both lacerations, of the cervix and perineum, closed. The uterus was reduced in size, the vagina very much narrowed, and a strong perineum established, also a small healthy cervix; but the smaller left angle of the cervical laceration did not perfectly unite, although all parts were covered by healthy mucous membrane and no raw surface remained, so that I looked upon the object as accomplished; still, the mental condition remained unchanged, and I ascribed the imperfect result, the continuance of the mental depression, to the slight retroversion which remained.

The patient, a farmer's wife, upon whom a household and three little children depended, looked forward anxiously to perfect restoration, and remained for treatment, which was conducted with all possible care, and a perfectly healthy condition of all pelvic organs was finally attained. No change, however, was effected in the mental status, and I advised the patient to go home and continue the use of douches and tampons, giving tonics, urging a milk diet—all to no purpose. Six months thereafter she returned, entered the Polyclinic, and treatment was resumed; again to no purpose: melancholia continued; patient was languid, with a dull, heavy appearance, indifferent to everything about

her, irritable when in contact with others, so that she was disagreeable to resident physician and patients, and her treatment became an annoyance to me. Seeing no result whatsoever, I determined to resort to a second operation. Though the cervix was small and the os appeared merely like an enlarged oval, not at all unusual for a multipara, lined with perfectly healthy mucous membrane, I again pared the left side, which had not perfectly united, and closed it with three catgut sutures. From the moment of her recovery from the chloroform her disposition was changed: her eyes were bright, the persistent melancholia had disappeared, and a pleasant smile now greeted her fellow-patients in place of the irritable avoidance which they had met with before. She was soon on her feet, a comfort and help to the other patients whilst she remained in the ward.

Although complete involution had been accomplished by the first operation, the mental disposition, depression, and irritability were in nowise changed, and not until a complete closure had been effected, and an os established hardly large enough to admit the sound, was this altered; but from the very moment that this angle was united by the suture the morbid mental symptoms disappeared, characterizing the marked dependence of the psychosis upon a trifling localized lesion.

*b. The Nervous System; Hystero-neuroses Proper; Genito-Reflex Nervous Disturbances.*

The terminal fibres of spinal and cerebral nerves give ready evidence of uterine and ovarian disturbance: whether the impulse is conveyed through the ganglionic system or the pneumogastric, spinal and cerebral nerves respond to uterine irritation either throughout the entire body or in circumscribed areas upon any one part.

Uterine changes are reflected in the course of the spinal column, in the hypogastric and lumbar regions, on the top of the head, on the occiput, the wrists and ankles, toes, knees; in fact, upon any part of the body. Most common of all these are the spinal and hypogastric pains, together with the pain on the top of the head and in the back of the neck, so that these symptoms have become pathognomonic of uterine disease. Tilt out of his 500 patients examined during the menopause finds dorsal pains in 226 and abdominal pains in 205; in fact, so thoroughly have these pains become assimilated in the popular mind with uterine disease that the physician will find it difficult to convince a patient that she could possibly have any disturbance of the reproductive organs if the backache and hypogastric pains are wanting; and if in addition no menstrual irregularity exists, this becomes simply impossible. Whilst these symptoms may remain permanent in one patient, varying with the vacillations of the condition upon which they depend, they change most rapidly in others—so much so that they

are likened to rheumatic pains, sometimes in one place, sometimes in another, moving about constantly.

As a rule, certain pains exist in one and the same patient, and vary with the causative condition; like all other hystero-neuroses, they are usually dependent upon a pathological condition aggravated by functional congestions, menstruation or pregnancy, but may also occur at the time of physiological congestion only.

These symptoms usually appear two or three days before the menstrual flow, with the coming of the uterine and ovarian congestion, and cease upon the second or third day after the flow has stopped: during its continuance they may disappear; if the neuroses persist, continuing throughout the intermenstrual period, they are intensified during the time of physiological congestion. It is a characteristic mark of a reflex neurosis that, like uterine disease, it is aggravated by exertion, exposure to cold, and menstruation—I may add, by every physiological wave; but as certain of these symptoms disappear during the continuance of the menstrual flow, they may disappear likewise during the period of pregnancy. They are frequent and more intense during puberty and the menopause than they are during the menstrual period.

The most common and well known of these symptoms are the dorsal pains, the pains in the small of the back, either limited to that point or extending, like the pain of labor, from the spine toward the hypogastric region: this pain may also occur between the shoulder-blades. The hypogastric pain is usually upon the affected side; that is, the side of the cervical laceration, the side of greatest ovarian irritation or of perituterine disease: like the higher dorsal pain, it may be at the height of the shoulder-blades, but lateral. This hypogastric pain, which is a reflex neurosis, must not be confounded with the actual pain of cellulitis or the pain from localized pressure, and careful differentiation is necessary, as certain of these reflex nerve-pains closely resemble inflammatory pains and those which arise from direct pressure either upon sensitive organs or upon a nerve, as upon the sciatic, and then extending along its course down the leg. Whilst the one is superficial and diffuse, the other is deep-seated, often more clearly circumscribed, and if from nerve-pressure follows the central nerve-tract so perfectly that this can be traced by the pain as in a dissection.

A very frequent sensation is that of quivering in the abdomen, likened by some to the quivering of a mass of jelly, frequently an evidence of ovarian congestion and mistaken for movements of the child by those longing for pregnancy. The pain, burning, and pressure on the top of the head are extremely common, and the spot feels warm to the touch or is so sensitive that the comb is painful. The pain in the nape of the neck and the drawing back of the occiput, as in opisthotonos, likened by the experienced to the evidences of cerebro-spinal meningitis,

is likewise frequent: more rare is the feeling of drawing upward of the neck and back of the head. Less common, but still frequent, is the feeling of an encircling band, the symptom being referred by some to the waist, by others to the chest or head—a painful sensation of compression as by an iron band.

Pains in the ankle and in the wrist are frequent, referable, as a rule, to the side of the pelvis in which the diseased part lies from which the reflex originates. These pains may extend to or appear in the soles of the feet, the heels, or the toes: they may be so intense as to make walking impossible. In a patient afflicted with ovarian disease and bedridden I have seen the pain in the heels so intense that it was with the greatest difficulty that a comfortable position could be found for her; she was obliged to lie on her back, so that her heels must almost inevitably touch the bed in some way, and even light contact with the bedding caused agony.

These superficial pains, genito-reflex nerve-symptoms, arising from reflex irritation in localized groups of terminal nerves, may appear in any part of the body: over the heart they cause the dread of cardiac disease, with cardiac and præcordial pains; in the shoulders, in the chest, they resemble rheumatism: whilst they may exist in any part, those named are the most common and characteristic. Many a patient afflicted with uterine disease without local symptoms is sent by the unsuccessful family physician to an eminent neurologist or to a watering-place for gastric or cardiac rheumatism. Even while writing this, in a European watering-place, I meet an American lady from the Far West who has been sent abroad to prominent physicians for treatment of an unyielding gastric and muscular rheumatism; these authorities have sent her to this spa to overcome what they have diagnosed as nervousness and nervous debility: the iron waters and salt baths, which have truly regenerated her merely debilitated sister, have failed completely in her case. Naturally so: a uterine disease is evidently the cause of this reflex neurosis, which simulates the above maladies, and no spa can overcome this causative affliction. Unfortunately, she is but one of many who gradually sink into invalidism under continued treatment of the phantom disease, the genito-reflex neurosis.

Most frequent (and in the order named) are the spinal and hypogastric pains, the pains in the top of the head, back of the neck, quivering in the abdomen, pains in the wrists, ankles, and heels. The pain of coccyodynia, whilst at times referable directly to pressure or disease of the bone or surrounding membranes, is liable to be a reflex neurosis, a concentration of spinal pains in the terminal bone.

So common and so well known are the dependence and fluctuation of these pains upon the improvement or exacerbation of local conditions that I need but briefly mention a few striking cases.



CASE XIV. *Pathological Genito-reflex Neurosis; Intense Spinal Pains due to Laceration of the Cervix; Complete disappearance immediately after Operation.*—Mrs. X——, from Mississippi, a beautiful octoiron, was completely debilitated by the intense backache from which she had suffered since the birth of a child some three years previously. She had been constantly under treatment, local and general, without relief: applications of all kinds had been tried—blisters, cauterly to the spine, the usual remedies to the uterus and cervix—with but temporary improvement at times. Relief was but rarely afforded, and then for a short time only.

Emmet's operation was performed, but no anæsthetic given, as the patient preferred to do without. Before she was removed from the table, from the moment the sutures had been united, the pain ceased: with slight assistance she walked to her bed, happy in the complete relief afforded. During convalescence she was free from all pain and felt perfectly comfortable. Upon the eighth day the sutures were removed: only partial union had taken place, and from the time of the removal of the sutures, as the surfaces fell apart, her backache returned. After the cessation of the next menstrual period a second operation was performed with precisely the same result: the backache ceased as soon as the parts were firmly united. I was unfortunately obliged to perform the operation under the most unfavorable surroundings, in a filthy hospital, and I am unable to speak of the final result, as the patient was carried away by septic poison. I cite the case, however, to show the dependence of this spinal pain upon a local cause—in this instance the laceration—and not, as is usually supposed to be the case, upon uterine displacement, traction upon ligaments, or pressure of the enlarged fundus upon the spinal column.

CASE XV. *Pathological Genito-reflex Neurosis; Relief by a Single Well-placed Tampon.*—Mrs. X——, from East St. Louis, suffering with a variety of reflex neuroses, insomnia, pain in the region of the heart and below the liver especially violent, so that cardiac and hepatic disease were supposed by the patient to exist, notwithstanding all I could say and the assurance to the contrary of the various specialists consulted. Repeated examinations of heart and liver revealed a healthy condition of those organs. The patient was afflicted with the usual concomitants of lacerations of the cervix and perineum—endometritis, uterine enlargement, retroversion, and, later, perimetritis. Many of the symptoms were relieved and her general health was greatly improved by operation on the cervix and perineum, but the neurotic pains, insomnia, and pains in the region of the heart and liver remained; hence treatment was again resorted to: great relief was afforded by utero-abdominal faradization. Reposition of the uterus was attempted by an

elastic tampon; still, though improved at times, the above-mentioned pains persisted.

The patient was under constant care in the gynecological department of the Polyclinic, and the routine treatment was continued; coming by accident on an off day, she was attended by a member of the staff hitherto unfamiliar with her case, Dr. T. E. Holland, who forced a reposition of the retroverted uterus much more violently than had been before attempted, causing the patient great pain. Two days later she returned completely relieved; she had suffered very much from the treatment and experienced a feeling, as she expressed it, of something giving way, but from that moment the annoying pain ceased and she slept soundly throughout the night: the persistent and annoying insomnia had vanished. Notwithstanding the pain locally caused by the tampon, the effect was a most happy one: the distressing mental and nervous condition of the patient yielded at once and gave way to perfect well-being.

CASE XVI. *Reflex Neurosis dependent upon Uterine Disease relieved by Uterine Galvanism, by Sedative Applications to the Irritated Uterine Terminals.*—Mrs. H—, suffering from a laceration of the cervix, with the consequent train of symptoms—endometritis, retroversion of the enlarged uterus, a congested and everted cervix—was afflicted with a series of violent reflex phenomena—dyspeptic symptoms, palpitations of the heart, dyspnœa, spinal pains, hypogastric pains, with a most annoying quivering in the abdomen, headache, and insomnia. Emmet's operation was proposed, but preparatory to this I advised treatment for the purpose of overcoming the more violent inflammatory symptoms, especially the endometritis. As treatment progressed her general condition improved, but the reflex symptoms were not alleviated. I had once resorted to electro-cauterization of the uterus with no more than slight improvement. Two days later I determined upon an electro-puncture, inserting a platinum needle, in connection with the negative pole, to the depth of one inch in the engorged cervical tissue, the positive dispersing plate being placed upon the abdomen: a current of 100 milliamperes was passed for three minutes, and before the expiration of the sitting the patient gave a sigh of relief and expressed her complete well-being. As she stepped off the table her motions were free, and when she returned three days later she informed me that she was perfectly well; her appetite was excellent; sleep perfect: the dyspnœa had disappeared; she had taken long walks, and was no longer troubled by the reflex neuroses—pain in the back and sides and abdominal quivering.

This is one of those cases of a reflex neurosis relieved by the sedative action of the remedy upon the irritated uterine nerve-terminals, and not by improvement in the uterine disease, as the symptoms had persisted

notwithstanding the change for the better in the local lesion, but disappeared at once apparently by the action of the electric current accidentally directed immediately to the suffering nerve.

CASE XVII. *Continuance of Genito-reflex Hystero-neurosis after Complete Extirpation of Uterus and Ovaries, cured by the Sedative Action of Galvanism on the Irritated Nerve-tracts.*—Mrs. K—— had been subjected to the extirpation of uterus and ovaries on account of a uterine sarcoma which was causing a rapid failing in health. After the operation, from which she rapidly recovered, her general condition improved greatly: she gained in flesh and general appearance, and lost the cachectic look which had previously existed. The burning pain in the top of the head which had annoyed her so much disappeared for a time after the operation, but soon returned, greatly increased in intensity, and with it appeared that pain in the ankles, shoulders, and soles of the feet which is characteristic of uterine and ovarian disease. These symptoms were so annoying that, after persistent treatment by the physician who had operated so successfully, she was referred as an incurable neurotic to Professor Hermann of the Department of Nervous Diseases (St. Louis Polyclinic).

When this patient came under Prof. Hermann's care she was hardly able to walk, so intense was the pain in feet and ankles on both sides. He treated this as a nervous disease, as he did the pain in the top of the head, affording relief by each application of electricity to the afflicted part; she was rendered more comfortable, better able to walk, but it became necessary to repeat the treatment, as the relief afforded was but temporary. Entering the clinic-room by accident whilst this patient was under treatment, Professor Hermann related her symptoms to me, and I at once urged that the case be turned over to the gynecological clinic, as it was evidently one of uterine disease. I was not a little astonished to hear that uterus and ovaries had been removed, yet urged the treatment of the patient upon the supposition of an irritation of the uterine terminals. She was accordingly referred to the gynecological department, and treatment inaugurated as for a reflex neurosis arising from pelvic disease: vagino-abdominal galvanism was applied, the negative vaginal electrode to the cul-de-sac, the positive abdominal plate directly over this upon the abdominal walls. After the first application greater relief was experienced than had ever been obtained by direct treatment of the affected parts; pains in both head and feet were greatly improved, and after the third treatment they practically disappeared, to return, however, after an interval of time. The patient came but a few times after this, and I have seen nothing more of her; whether relieved or not by the treatment I cannot say; certain it is that the pains in head and heels were relieved more rapidly and more completely by the application to the uterine tracts than to the site of pain.

I have cited this case in evidence of the fact that reflex neuroses may be induced by a continuance of the irritation in a nerve-fibre even after the causative terminal is removed: the impulse emanated from the stump of the uterine fibre at its point of amputation, precisely as it had from the terminal before its removal. Precisely as a pain of former years is often felt in a foot long after amputation of the leg—which must be referred to morbid action in the nerve at the point of amputation—so did this uterine fibre determine a reflex action as if the causative terminal was still under the influence of morbid action. The result is at the same time an evidence of the possibility of affording relief in case of reflex neuroses by sedative action upon the affected nerve-terminals, though the morbid condition which causes the impulse may continue.

## II. THE CIRCULATION.

The circulatory system throughout the entire body is under the direct control of the vaso-motor nerves, which follow its innumerable ramifications from the cardiac centre to its capillary meshes. By reason of the direct connection of the ganglionic fibres with the vaso-motor nerves, these readily respond to changes, morbid or physiological, which may take place in the vital centres. No system gives evidence of these reflex impressions more rapidly or more vividly than the circulatory: in response to peripheral stimulus we see the hot flush of the dilated capillaries or the cold pallor of the contracted vessels which mark the undulation in the vaso-motor fibres—on the one hand paralysis, increased tension on the other. All nerve-action finds a ready reflex in the vaso-motor system, so much so that we involuntarily regard this as an index of the emotions and the secret workings of the mind. Hardly less than the changes in the great cerebral centre are the waves emanating from the reproductive organs delineated by these sensitive fibres. Hippocrates has already called attention to shivering and an unusual development of heat as a sign of pregnancy—symptoms of a purely reflex nature, and not in any way referable to the increased vascular development accompanying the physiological hypertrophy.

So intimate and so intricate is the relation existing between the vaso-motor nerves, uterus and ovaries, and the central nervous system that it is not always easy to trace the existing relation and to determine cause and effect: a peripheral congestion or hemorrhage may be a simple concomitant or a natural result of pelvic congestion, or it may be a reflex symptom. The circulatory system may respond to uterine or ovarian irritation in its entirety or in any one of its parts, as it is governed throughout by the accompanying fibres and ganglia, which control its every action as truly and as promptly as a steam-valve does the workings of the engine; hence genital irritation may be character-



ized by symptoms on the part of the heart or portions of the peripheral system, especially superficial capillaries upon the skin; or this reflex may be general throughout the entire peripheral system, made evident by a chill or fever; or, as is more usually the case, it is localized, and recognized by the coldness of hands or feet or by the flushes of the face. Coldness of extremities is a frequent symptom of uterine disease; palpitations of the heart, irregularity of the heart's action, usually intermittent, accompany morbid conditions. Ovarian disease is often marked by flushes—by the hot flushes of the face which we frequently find at the change of life, where it may, however, be dependent upon irregularity of the circulation. These symptoms, so varying in their nature—all, however, the result of contraction or relaxation of portions of the vascular system in response to morbid stimulus carried from uterus and ovaries to the vaso-motor nerves through the ganglionic system—may be classified as,

1. Cardiac or central; and
2. Vascular or peripheral.

1. *Cardiac or Central Circulatory Reflexes*.—As the heart's action varies with the emotions and the state of mind, so it responds to a variety of uterine or ovarian states, both physiological and pathological. I will not enter upon the difficult differential diagnosis between physiological hyperactivity and the reflexes of pregnancy, as observation alone can determine the origin of symptoms referable in part to one, in part to the other cause, and I shall speak only of the true or pathological reflexes, as the same phenomena may exist as menstrual neuroses and neuroses of puberty and the menopause.

(a) *Palpitations of the Heart*.—This is among the most common of the hystero-neuroses, as it is the most frequent response to emotional impulse; but not until this violent beating of the heart has been proven to be a uterine reflex by cessation upon uterine treatment can its origin be definitely determined, as the same symptom is referable to so many other causes.

(b) *Rapidity of the Heart's Action*, frequently accompanied by intermission, I have repeatedly observed as a symptom of uterine disease annoying the operator, who may be in doubt as to the propriety of using anaesthesia until he has fully solved the question of cardiac disease.

The direct dependence of cardiac action upon ovarian changes is strikingly evident in the sudden slowing of the heart-beat upon constriction of the ovarian nerve. So striking is this symptom that repeatedly has the careful assistant, while giving the anaesthetic for me, called a halt and inaugurated resuscitation as the pulse fell from 80 to 34 at the moment of ligating the ovarian pedicle. My attention being thus called to the matter, I have observed the same reaction in almost

every instance, and have assured myself of the direct dependence of the heart's action upon the ovarian impulse by the loosening of the ligature, in response to which the beat at once returned to the previous frequency. Dr. Hodgen, our lamented surgeon, informed me that he had observed the same phenomenon in ligating the spermatic vessels before removal of the testicles. Whilst a very rapid beat of the heart, 120 to 130 in the minute, may accompany uterine and ovarian disease, this is often varied by an intermission more or less regular, sometimes one in six or eight, even in three or four; and again it may be observed repeatedly in rapid succession, and not again for minutes.

(c) *Pains in the Heart*, such as may simulate an endocarditis, are frequently complained of by women suffering from uterine disease or when in a state of functional change during menstruation and at the change of life. Occasionally it is precordial, more like a rheumatic pain, or it may appear as a feeling of compression, as if by an iron band, which is spoken of.

These symptoms, violent palpitations or irregularity of the heart's action and pains in the cardiac region, so nearly simulate heart disease that a careful examination may be necessary before the giving of an anæsthetic; and so deceptive are they that I have repeatedly sent the sufferer to a specialist for examination, notwithstanding that, as in other neuroses, we have a reasonable assurance of the reflex nature of the symptom by its exacerbation at the menstrual period or upon a slight cold or exertion, such as would aggravate the existing uterine symptoms; and upon this I would lay perhaps greater stress than upon the negative evidence of auscultation and percussion, which assure us only of the absence of disease.

The cardiac reflexes of pregnancy are more obscure, as actual circulatory changes exist at the time, and it impossible to demonstrate their true nature by removal of the cause; hence I have not touched upon these, and have cited only such as have been clearly proven to be reflex in their nature by their prompt cessation upon the cessation of the cause of the trouble.

The cardiac neuroses, more than those of other organs, have of late received attention on the part of careful observers. They are symptoms of extreme importance from a practical and diagnostic point of view. I need only refer to the results of an erroneous diagnosis in the case of a patient seeking insurance: she is disbarred from all its advantages on account of a slight, possibly unnoticed, uterine disease which produces the deceptive vaso-motor reflex. If the neurosis is mistaken for the disease proper, her family are deprived of the benefits of life insurance.

Although the phantom is distinct from the disease, its reflex nature is by no means practically appreciated, as it should be even by those

who have given attention to the subject. One of the most instructive articles is the chapter on neuroses of the heart<sup>1</sup> in *Pepper's System of Medicine*, volume iii. p. 750, in which the symptoms are clearly outlined, but their treatment as a reflex disease hardly demonstrated with sufficient emphasis: the cardiac neuroses are here considered as a whole, from whatever source they may originate.

The cardiac hystero-neuroses have also been well described by H. J. Boldt, M.D., in a paper on "Cardiac Neuroses in Connection with Ovarian and Uterine Disease," read before the New York Academy of Medicine,<sup>2</sup> who prefers the term "reflex cardiac disturbance" for those fluctuations which present symptoms similar to those attended with organic lesions, deeming the term "neurosis" faulty, as these troubles are either of reflex origin or arise in the cardiac ganglia. Boldt believes these functional affections of the heart, unaccompanied by inflammatory changes, to appear as reflex symptoms in 8 per cent. of all uterine diseases, and divides them into four classes: 1, palpitation; 2, disturbance of rhythm (irregularity); 3, suspension of one distinct beat (intermittency); 4, angina pectoris. Class 1 is the most frequent neurosis, being caused by the emotions; Class 2 is caused by a modification of the rhythmic discharge in the cardiac ganglia; it may be congenital or the result of emotion, as passion, grief, joy. Angina pectoris, the most painful of all the neuroses, so closely resembles the symptoms of organic lesion that only an examination of the heart during the attack would exclude this: the pain is often felt radiating down the left shoulder, arm, and hand, in which formication is at times observed. These attacks are intermittent, the patient being entirely free in the interval: the heart's action is at times feeble, at times irregular, and painful spots are found over the region of the heart. The functional disturbance, he correctly says, may be cured by attention to the pelvic disease, but in chronic cases attention to the pelvic disorder alone will not suffice, systemic treatment being necessary. This is more or less true of all hystero-neuroses, yet some become more firmly established than others: those of the eye are the most persistent, as we have seen. While in their early stages the cardiac neuroses respond readily to changes in the uterine condition, at a later stage, when the molecular disturbance in the contracting nerve-fibrils is long continued, it will persist after removal of the causative stimulus. Though constitutional medication may assist in treatment, and is always desirable in chronic cases, this alone should not be relied on if a cure is to be achieved.

2. *Vascular or Peripheral Circulatory Neuroses*.—These may be general or local, referable to the entire system, like the fever, or limited to

<sup>1</sup> "Functional Diseases of the Heart's Action, Angina Pectoris, and Exophthalmic Goitre," by Austin Flint.

<sup>2</sup> *American Journal of Obstetrics*.

a circumscribed region, internal or external; upon the extremities, cold feet; on the face, a flush; upon the mucous membrane of throat or lungs, a laryngitis or an asthma.

(a) *General Peripheral Neuroses*.—The most marked of these are chills and fevers, which can be unquestionably referred to changes in the reproductive organs. The chlorosis which is often observed at the change of life and in connection with uterine disease has been considered by some as a circulatory disturbance attending the ovarian nîsus, and it has been explained as a resultant of the ovarian impulse in an already ill-balanced circulation. As I have myself not satisfactorily demonstrated the direct causative relations, I am unable to assert the positive reflex nature of chlorosis. The chills, known to the sufferer herself as nervous chills, are more readily referable to local changes; but most characteristic and most deceptive are the fevers, with or without elevation of pulse, apparently a partial paralysis of the entire vasomotor system.

This peculiar peripheral hystero-neurosis of the circulatory system appears either as a resultant of some exacerbation of the morbid uterine stimulus, now and then after undue exertion or other cause of aggravation, or as an accompaniment of the physiological wave with the intensity and with the regularity of a malarial attack. It was the occurrence of these reflex fevers that called my attention to the peculiar periodicity in certain of the symptoms of uterine disease; and I have described them more fully in a paper read before the gynecological section of the Eighth International Congress.<sup>1</sup> The fever comes with a certain intensity of the uterine irritation, and subsides whenever the morbid stimulus sinks below the given point; thus in some patients the fever occurs only after unusual irritation and aggravation of the uterine disease; in others it is constant, and subsides only when every precaution is taken and every, even the ordinary, irritation is removed. I have occasionally seen patients with a constant slight heat, called fever, which ceased and yielded to a normal temperature only upon rest in bed: whenever the friction of the eroded cervix against the vaginal walls was prevented by a recumbent position the fever ceased; walking would aggravate it. Those symptoms which come with a daily periodicity and monthly recurrence, coming like a malarial attack daily at a certain hour at a certain time of the menstrual period, seem to be confined to the malarial regions, such as the Mississippi Valley. That this periodicity is not an exciting febrile reaction or in any way referable to malarial origin has been proven by the absolute inertness of antiperiodic remedies and the positive correspondence of the vacillation with the uterine symptoms. The fact that these symptoms have been

<sup>1</sup> "The Periodicity of Symptoms of Uterine Disease," by George J. Engelmann, *Transactions of Section of Obstetrics of the Eighth International Congress*.



but rarely if ever observed elsewhere necessitates the conclusion that this periodicity is referable to intercurrent malarial influence; but it can be only the periodicity of nerve-action so influenced, as the typical recurrence is the only point of resemblance.

The symptoms in which I have observed this periodicity are fever, pelvic pain, nerve-pain, and discharge; fever and pelvic pain are the most frequent. Most striking in our malarial region is the appearance of high intermittent fever of strictly miasmatic type, which is not influenced by quinine, and is unquestionably dependent upon uterine disease, as proven by the disappearance of the fever with the improvement in the condition of the womb. Cause and effect are made evident by the failure of antiperiodic medication and the success of local treatment without accompanying medication, the disappearance of periodic symptoms with the restoration of the diseased uterus to its normal and healthy state.

CASE XVIII. *Intermittent Fever toward the Close of the Intermenstrual Period.*—Mrs. S—, from Illinois, æt. 32, in good circumstances, the mother of four children, had been suffering more or less since the birth of her youngest child, five years ago, from debility, nervous prostration, backache, and pelvic pains; her condition was such that she was under constant treatment, yet no signs of improvement appeared; on the contrary, her condition grew slowly worse, so that she was unable to attend to her household duties, and came to St. Louis to consult me.

I found the uterus anteflexed, indurated, and enlarged in consequence of the existing subinvolution, with a catarrhal condition of the mucosa of cervix and fundus, and the latter hypertrophied. In addition to the symptoms already mentioned, the patient suffered, at the close of each intermenstrual period, from an intense and debilitating intermittent fever: this fever, with acceleration of pulse and rise of temperature, appeared upon the fifth day before the coming of the menstrual flow at eleven o'clock in the morning, reaching its acme at one, continuing during the afternoon, and passing away in the evening; it thus returned day after day until the coming of the menstrual flow. For several years this intermittent, apparently malarial, fever had recurred before each menstrual period, and from the time of its first appearance her attendant (her uncle), one of the ablest and most respected physicians in that section of the State, thoroughly conversant with malaria and all its varied forms, had in vain attempted to subdue it until he had exhausted antiperiodic medication. Quinine had been given until the stomach was affected and the patient rebelled against its continuance.

This was the first case of the kind I had observed, and when the fever came on, so thoroughly identical with a malarial fever in all its symptoms—the inaugural chilly sensation, the pains in back and loins

radiating downward into the thighs, especially the bilious tinge of the face—I did not doubt its miasmatic origin, and concluded to treat it as such, much to the horror and disgust of the patient, a very sensible and observing lady, who assured me over and over again that these fevers had invariably taken the same course and disappeared with the coming of the flow, whether she had taken quinine or not, and that she even felt worse when medication was attempted, as the frequent use of quinine had made it obnoxious to her.

Nevertheless, believing the previous treatment to have been inefficient, I gave eight grains of calomel, which I followed with thirty of quinine, repeating the quinine before each attack of fever. I failed completely to change its course.

I then suspended all medication and allowed the next period to pass without medication of any kind: the fever returned as usual, but was no more severe than with the use of quinine.

As treatment progressed the severity of the fever diminished, and ceased altogether after I dilated and curetted the uterine cavity. Some months later I dismissed the patient, who returned to her home and her household duties in the full enjoyment of health. This occurred ten years ago, and, although Mrs. S—— has now and then suffered from slight intercurrent diseases, the premenstrual intermittent fever has never returned.

CASE XIX. *Intermittent Fever in the Middle of the Intermenstrual Period.*—Miss A——, æt. 19, a well-developed brunette, in the most comfortable circumstances (the patients to whom I here refer come from the higher walks of life), who had but recently left school, where she had over-exerted herself like so many American girls, suffered from neurasthenia, indifference, prostration, backache, pain in the head. Her home is in a beautiful and healthy portion of Missouri, yet for almost a year she suffered, in the middle of each intermenstrual period, from a severe intermittent fever which recurred upon three successive days. Every possible attention was bestowed upon this only daughter by anxious parents: she had been under the treatment of the best physicians, especially one able practitioner, a near relative, yet neither medical skill nor change of climate accomplished any perceptible change in her condition.

When she was placed under my care I discovered an enlarged, slightly movable retroflexed uterus with marked endocervicitis, accompanied by the symptoms usually characteristic of such disease, the only peculiar and unusual feature being the attack of intermittent fever, which invariably came on the eleventh, twelfth, and thirteenth day after the cessation of the monthly flow, in the middle of the intermenstrual period. The attending physician, supposing it to be malarial, had never failed to give quinine, and repeated his medication, which had

been varied in every possible manner each month, because it was supposed, notwithstanding the regularity of its return, that the progress and the continuance of the fever were at least checked by the antiperiodic treatment. Quinine was taken again and again, though the system began to revolt, as the recurrence of these burning fevers told severely on the delicate sufferer.

I had but inaugurated local treatment when the period of these dreaded fevers approached, and I well knew that it would return, as the disease was not yet sufficiently under control; but experience had also taught me the utter inefficiency of quinine or medication of any kind (nervines relieve the condition somewhat and make it more bearable).

I explained this to patient and friends, prepared them for the coming of the fever, but at the same time assured them that it would cease at the usual time without medication, and probably never again return. The attack came at the usual time, at ten o'clock on the evening of the eleventh day after the cessation of the menstrual flow, and continued during the night; upon my visit next morning she was entirely free from fever, but in the evening it returned as usual; dreading its continuance, the patient's mother anxiously demanded the giving of quinine, but finally desisted upon my assuring her of the futility of the remedy. During the night of the third attack, on the thirteenth day of the intermenstrual period, I was sent for, that I might assure myself of the intensity of the fever, and in hopes that I would then be induced to give quinine. The patient was certainly in a desperate condition—almost delirious, face flushed, hot, eyes congested, skin dry and hot, throat and lips parched—and her mother naturally dreaded a repetition, and again urged the giving of quinine, threatening to give it herself, in the firm belief that it was the use of this remedy only which had cut short all former attacks on the third day. It was with difficulty that I succeeded in urging her to refrain from its use. The fever disappeared as usual, without the use of quinine, after the third attack, just as it did when large doses had been given, and one month later, when local treatment had sufficiently progressed and the condition of the uterus had improved, the flexion and endocervicitis had been relieved, no fever appeared, to the great relief of every one, and the much-dreaded period was passed with perfect comfort. All other symptoms steadily improved, and the fever has not since returned, time sufficient, four years, having now elapsed.

(b) *Localized Genito-reflex Vascular Neuroses*.—Among the peripheral vascular reflexes which are localized, we find most commonly the flushes, rush of blood to the face and head, the burning in the top of the head, the burning of the side, more rarely heat in the extremities; a red nose; cold hands or feet, dry or clammy; blotches like an erythema

upon different parts of the body, even ecchymosis; sweats, hypersecretions, and bleeding, which upon the mucous membrane may be compared to the erythema and the ecchymosis upon the skin. Certain of these symptoms, such as acne rosacea and lichen, I shall discuss under the dermatoses. Tilt in his analysis of 500 patients examined during the menopause has observed the flushes in 287; perspiration in 201; sweats in 89; burning of legs and feet in 2; hot hands in 3. The flushes apparently so frequent at the time of the menopause are by no means equally common as a reflex of pelvic disease, but all the more noticeable as the flushes contrast so strikingly with the usual sallowness which marks these conditions. The reflex nature of these phenomena can often be demonstrated at will with the certainty of a chemical test; as, for instance, in a lady under treatment for the last few days, during which short time the burning in the top of the head, like the general fever, has somewhat diminished, but at all times it can be stopped in a moment by perfect quiet and a recumbent position in bed, by which the causative uterine irritation is removed.

CASE XX. *Genito-reflex Peripheral Neuroses; Paralysis of Vasomotor Nerves; Flushed Appearance, especially marked on face and neck; Small Uterine Fibroma, Metritis, Endometritis, and Oöphoritis; Disappearance upon improvement before complete cure of the local disease.*—Mrs. M—, aged 36, married eighteen years; sterile; stout and of a deceptively healthy appearance, strong constitution; a sufferer since the time of her marriage from chronic uterine and ovarian disease. Patient has been under treatment during the entire period of her suffering. When first seen by me in October, 1885, she was completely prostrated, suffering from various reflex symptoms, the pelvic disease in no way marked by local symptoms. The intense cerebral pain and insomnia, which led almost to mental aberration, were the symptoms which called for relief. While the face and greater part of the upper extremities were suffused with an almost constant flush, the feet were icy cold, and she complained of a feeling of internal chilliness—as she expressed it, “as if all the blood had centred in her face and head, leaving her inner organs icy.” Persistent treatment directed especially to the ovarian congestion and the stenosis and hyperplasia of the uterus caused the reflex symptoms to lessen and a healthy cutaneous circulation was re-established; coldness of the feet was improved, and the flush disappeared from the face, and even excitement caused but a temporary and slight reappearance.

In January, 1887, I was summoned to the residence of Mrs. M—, whom I had not seen for the past six months, and whose condition had been bearable during this time. Physical exertion and mental excitement had caused an aggravation of her trouble, especially an exacerbation of the nervous symptoms and aggravation of the insomnia, and the



cerebral pains of the menstrual period amounted almost to mental aberration. The flush had returned. I may here remark that before its entire disappearance, with decided improvement of the local condition, a temporary lessening of the symptoms had always followed slight dilatation of the narrowed canal with slippery-elm tents. The conditions not being favorable to treatment at home, I referred the patient to a European colleague, and have not heard from her since.<sup>1</sup>

This constant flush, so painful, especially to a lady having already a full healthy face, is still less disagreeable than a facial flush more limited in extent, as it sometimes occurs; for instance, upon the nose.

This paralysis of the vaso-motor nerves may be confined to isolated ramifications, and then appears as an erythema—small blotches, perhaps of the size of a quarter or a half dollar, on face, chest, or back. Usually, this is an accompaniment of the menstrual congestion or of an exacerbation of uterine disease, rarely a permanent neurosis. So also are the ecchymoses, which are usually of similar size, less frequently only the size of a pea. In those cases in which I have observed them they occurred as the accompaniment of uterine and ovarian disease of long standing, and in one instance as a neurosis of puberty.

The tumefactions which sometimes occur are similar in size and distribution, perhaps of the size of half a walnut, usually the evidence of menstrual exacerbation of uterine disease.

The burning in the top of the head is so frequent that it has come to be a most acceptable evidence of uterine and ovarian disease; but this reflex paralysis of the vaso-motor nerves, which is made evident not only by the sensation of heat to the patient, but by the feeling of heat to the examining hand, must not be confounded with the pain in the top of the head, which is distinctly a nervous reflex (a peripheral nerve-reflex).

Cold hands and feet are likewise common genito-reflex vaso-motor symptoms, and not by any means, as is generally supposed, the result of impaired nutrition, anaemia, and long-existing disease: that they exist most frequently as a direct reflex is proven by improvement upon treatment of the causative disease, or aggravation with exacerbation of uterine disease upon exertion or cold or with the coming of the menstrual congestion.

<sup>1</sup> I regret the necessity of adding that the lady, so far, has not been benefited: much that would have been advantageous has been more than counterbalanced by the peculiar course pursued. Several of the physicians abroad who had been consulted evidently looked upon the full-flushed face as the result of over-indulgence in spirits, and placed her upon the Oertel diet and walking cure. The puffed, flushed face of this peculiar reflex vaso-motor disturbance is indeed a curse to those so afflicted: to this patient it has been a great detriment, as it has deceived even the authorities consulted, and has led to a line of treatment most detrimental to the causative pelvic disease; hence the reflex also is now growing worse.

Perspirations, local and general, more commonly local, are occasionally met with ; at times, like other of the vascular reflexes, upon that side of the body upon which we find the causative disease—upon the left side if the laceration of the cervix, the diseased ovary, or a certain uterine inflammation be upon that side. The bleeding from the navel, from the eyes, nose, mouth, is rarely found, but does occur as a reflex symptom, not to be confounded with a vicarious menstruation or a localized peripheral congestion which is the result of an impeded flow from the uterus.

CASE XXI. *Genito-reflex Vaso-motor Paralysis; Monthly Bleeding from the Navel.*—Mrs. R——, aged 26, a slight blonde, originally of healthy constitution, now impaired by a succession of severe diseases during childhood and puberty, came to me for relief from dysmenorrhœal pains : the recurrence of a pleuritic attack, which had once before terminated in purulent effusion, interfered with the progress of the treatment, and after recovery the thoracic disease, by which the constitution of the patient had been undermined, mainly demanded attention, and I could only endeavor to relieve the more violent of the uterine symptoms, as a satisfactory improvement was not to be expected in a patient so enfeebled by thoracic disease. Among the symptoms which accompanied the menstrual exacerbation was a slight oozing of blood from the navel, which had been treated in vain by the family physician of the patient in a neighboring State ; but after a partially successful uterine treatment the symptoms abated, to return some months after cessation of local treatment with an exacerbation of uterine disease.

CASE XXII. Mrs. X——, who had been under the care of various physicians, mentioned among her numerous ailments, the direct and indirect resultants of uterine disease, a menstrual bleeding from the nose, ears, mouth, and the corners of the eyes—a statement very much doubted at the time, but since proved. She informed us that for the past year, with an aggravation of pelvic trouble, these slight local hemorrhages had appeared, and recurred with greater severity whenever cold or exertion caused an increase of local suffering.

The reflex neuroses of the circulatory system cannot be classed among the most annoying, as they are rarely so severe as to cause great suffering. Like all other reflexes, relief is vainly attempted by direct treatment, but to a proper uterine therapy they yield readily. The palpitations of the heart, the burning in the top of the head, and the cold feet are among the most common and available as diagnostic signs of pelvic disease. Disagreeable to the patient are the cold feet, from which relief is vainly sought by hot water and hot bricks in the bed in winter ; the feeling is a most disagreeable one, and annoying, as but little comfort is experienced from the heating of the bed : in this and in the nervous

irritability caused the reflex symptom differs from the cold feet, which are a simple evidence of sluggish circulation.

One of the more common of the peripheral vasculo-neuroses is the heat and burning in the side—not the burning of internal inflammation, but a reflex vaso-motor symptom, like the flush of the face or the burning in the top of the head—a pelvic burning, most frequently the accompaniment of ovarian disease, and generally limited to the side of the abdomen upon which the diseased ovary lies.

### III. RESPIRATORY TRACT.

Through the connections of the pneumogastric with the pelvic nerves and ganglia an intimate relation is established between the respiratory and reproductive organs, and the morbid impulse conveyed by irritation of the uterine and ovarian terminals meets with prompt response in the respiratory organs, which results in symptoms on the part of pharynx, larynx, and bronchi so closely resembling disease proper, with pathological changes, that a correct diagnosis without the aid of tentative treatment is often impossible: so little appreciated is the possibility of such reflex origin that the patient becomes a martyr to medication, and unless, by chance, local symptoms reveal uterine disease and determine treatment, the entire materia medica may be exhausted in vain attempts to cure what is supposed to be a pharyngitis, a laryngitis, or an asthma.

Respiratory reflexes likewise occur as a response to irregularities of the stomach, so that gastric laryngitis and pharyngitis have become recognized forms of throat disease, and asthma is being looked upon more and more as purely nervous, a reflex vaso-motor affection. Dr. Glasgow in a recent paper<sup>1</sup> admits that asthma occurs at many of the critical periods of female life, and that a marked connection exists between the cavernous bodies and the uterine changes. He says that many women at the menstrual period have a vaso-motor excitement with great turgescence of the cavernous bodies and of the mucous membranes.

1. *Hystero-neuroses of the Pharynx.*—These neuroses, resembling a true pharyngitis in every detail, with the absence of only the febrile symptoms, I have observed only as menstrual neuroses due to uterine disease, appearing with the menstrual congestion, with uterine or general pelvic disease.

The entire pharynx may be affected, but more commonly the reflex is confined to the side corresponding to the side of the diseased pelvic viscus or to the side of the most intense morbid changes in the reproductive organ. The symptoms of disease are so manifest that the prac-

<sup>1</sup> "Etiology and Mechanism of Asthma," *Am. Journ. Med. Sci.*, July, 1887, p. 111.

itioner can hardly be blamed for resorting to astringent applications and internal medication unless he be warned by the peculiarities of the disease—marked among them the monthly recurrence regardless of temperature and exposure, which we should hardly expect in a simple pharyngitis. The cases which I have observed had all been previously treated by various practitioners, and at last, as they appeared so persistent and unyielding, with most powerful remedies, of course always to no purpose. Like all other reflex phenomena, the reflex pharyngitis and tonsillitis is inaccessible to local treatment, whilst it yields at once to improvement of the uterine or ovarian condition.

CASE XXIII. *Genito-reflex Pharyngitis, with Tonsillitis, recurring monthly, unyielding to local medication, overcome by treatment of the pelvic disease; Causative Endometritis, Oöphoritis, and Perimetritis, most intense on the right side, like the pharyngeal symptoms.*—Miss B——, from B——, aged 23, had enjoyed good health until exposed to a severe cold by breaking through the ice while skating. The inflammatory conditions thereby excited in the pelvic viscera and imperceptibly progressing have finally undermined her entire constitution. Upon examination I found an endometritis with metritis and cervicitis, also cellulitis, especially marked in the right side like the oöphoritis. The patient complained of palpitations of the heart, general nervous prostration, weakness of the eyes, globus hystericus, and an inflammation of the throat recurring with each menstrual period: the pharynx is sensitive, the mucous membrane congested, the tonsil enlarged, especially on the right side. A few days before the appearance of the menstrual flow the tonsil begins to hypertrophy, and, regardless of any treatment, the swelling of the tonsil and congestion of the mucous membrane continue until the cessation of the flow. The patient, generally costive, is afflicted with a menstrual diarrhœa, which appears, like the pharyngitis, with the menstrual congestion a few days before the coming of the flow, and disappears during its continuance, to return for two days after cessation of the discharge.

I saw this patient before I had been attracted to the study of the hysteroneuroses, and paid but little attention to the pharyngeal symptoms: as she had come to me with well-marked uterine and ovarian disease, no treatment was attempted for the supposed pharyngeal disease, especially as I was told that the family physician, who had treated this recurring affection for many months, proposed to cut out the right tonsil, which was the one most inflamed during the attack, as all previous efforts had failed. Miss B—— had been under treatment but two weeks when the menstrual flow appeared. The pharyngeal attack preceded the flow as usual, but in a milder degree; the menstrual diarrhœa, however, appeared in a greatly aggravated form. My interest was now thoroughly aroused, and I attempted no treatment whatsoever



directly for the pharyngeal disease. With continued improvement in the pelvic symptoms the third period passed without any intestinal or pharyngeal reaction—neither diarrhœa nor pain nor swelling of the tonsil.

This is one of several cases precisely similar in character which came under my observation. I must observe that all occurred in young girls: whether this was an accidental coincidence or not I am unable to say. It is needless to relate histories of cases so similar in their nature: pelvic disease accompanied by a menstrual pharyngitis, with swelling of the tonsil, in one instance with follicular ulceration, reappearing monthly with the menstrual congestion, and ceasing soon after the disappearance of the flow; in another, in which examination and uterine treatment were not permitted, the reflex pharyngitis resisted all treatment by myself and at the hands of others; always worse with an exacerbation of the menstrual pains, improving only with an amelioration of the pelvic symptoms, to disappear after years with an improvement, local and general, brought about by rest, great care, and constitutional treatment. Several striking cases of this kind are recorded in the valuable paper on "Pharyngeal Neuroses due to Uterine Disease," by Dr. Edgar Holden of Newark, N. J., published in the August number of the *New York Medical Journal* for 1877.

Dr. Holden gathers four instructive cases from a number which have come under his observation: in all but one the patients were well-to-do, one only unmarried, the youngest twenty-four; the eldest, who had borne seven children, forty-three, approaching the change of life; two of them remarkably healthy and robust. The sufferings of the patients were continual and severe: their complaints were about the same, of intense aching pain just behind the whole length of the posterior pillars of the palate; sore throat extending up and down the sides; pain varying in intensity, often worse after fatigue, rarely lancinating, more of a slow, torturing ache.

In no case did the most careful examination, rhinoscopic and laryngeal, reveal any signs of disease in the parts complained of. The patients had been treated by Dr. Holden and by others for subacute pharyngitis with local applications of nitrate of silver or chloride of zinc, sometimes without benefit, sometimes with temporary relief, but in no instance with perfect success.

In the second case mentioned by Dr. Holden, after the treatment of the throat difficulty had been abandoned, the success being but partial, the patient came to him for treatment of her dysmenorrhœa due to ante flexion and endocervicitis. The erosion and inflammation were successfully treated, and the pharyngeal trouble disappeared, recurring at times, but permanent relief finally followed the removal of the extreme anteversion.

2. *Laryngeal Neuroses*.—By far more frequent are the laryngeal neuroses, marked by an intractable and disagreeable cough, short and hacking or spasmodic, accompanying the advent of puberty or referable to malposition or disease of the uterus. As in most of these reflex semblances of disease, examination reveals a healthy larynx, the vocal cords of a glistening white, slightly reddened by the constant exertion if the attacks are severe or the cough constant and frequent. This neurosis may accompany the irregularities of menstruation, especially during the advent of puberty, and disappear when the function is well established; but usually it is referable to a stenosis of the canal or a uterine catarrh, perhaps with painful dysmenorrhœa, and the coughing spell is coincident with the period of most intense menstrual pain: its reflex nature is thoroughly characterized by the ready disappearance upon proper uterine treatment and an utter indifference to laryngeal medication and manipulation, though sedatives will relieve: as soon as the uterine disorder is improved the cough ceases.

We must not confound with this hysteroneurosis hysterical aphonia or the laryngismus in nervous and hysterical women, those distressing paroxysmal attacks of coughing or of suffocation and strangulation, which are as harmless as they are alarming, and disappear as rapidly as they come. These we might call nerve reflexes, not referable to a certain genital lesion, fluctuating with its changes, coming with each menstrual period or with uterine exacerbation, but, like other hysterical symptoms, dependent upon the emotions.

3. *Hystero-neuroses of the Bronchi: Genito-reflex Bronchial Symptoms*.—When the bronchial filaments of the pneumogastric and those of the plexus pulmonalis respond to uterine irritation, the hysteroneurosis of the bronchi is developed, which is often most intense in character, and, like all other reflex symptoms, absolutely inaccessible to such medication as would appear indicated for the disease which is simulated: unless the key is found, and the often trifling genital lesion discovered from which the impulse is imparted, it is impossible to relieve the violence of the bronchial reflex, which may so harass the patient that health is impaired and the constitution undermined. Barnes in his paper on the "Relation of Pregnancy to General Pathology"<sup>1</sup> says: "There seems to exist a striking solidarity between the uterus and respiratory functions; the first is supplemental of the second. A notable proportion of the materials of the blood is expelled by the menstrual flux, and this fact explains the small activity of the pulmonary function whilst the uterus is active. With cessation of uterine activity at the menopause the lung function assumes greater activity; the quantity of carbonic acid exhaled is increased, as if to regain the level below which the menstrual flux had kept it; and with the thor-

<sup>1</sup> *Transactions American Gynecological Society*, 1876, vol. i. p. 141.

ough establishment of the menstrual flow the increased exhalation of carbonic acid which accompanies healthy development, and continues in boys, remains stationary.”

An intimate relation exists between these important functional centres; and Barnes has described rather the coexisting and resulting symptoms, not the direct reflexes, which form a most important group; but the lungs and bronchi, by reason of the direct connection of the pneumogastric with cerebral and ganglionic centres, are also liable to be excited to reflex activity by a trifling stimulus imparted by other terminal irritations, especially from the nasal mucosa. The violent asthmatic attacks which sometimes occur as reflex symptoms were first recorded by Voltolini, and referred by him to nasal polypi; and even now the best known of the bronchial neuroses are those which appear in response to morbid states of the posterior nares. Hack<sup>1</sup> enumerates some of the more striking of these reflex neuroses: he has observed epilepsy, uncontrollable cough, asthma, and violent attacks of sneezing in response to such nasal irritation. Like the uterine reflexes, these nasal neuroses are confined, as a rule, to the side of the nasal disease, if that be unilateral: thus, a left hemierania appears in response to a chronic catarrh of the left nasal mucosa.

Fraenkel has devoted much attention to the subject, and the remarkable cures achieved in asthmatic attacks, however violent, when of a reflex nature, by galvano-cauterization of the indurated mucosa aroused the delusive hope in certain recent writers, by false generalization from individual cases, that the form of asthma known as hay fever might be overcome by such cauterization.

Hack dwells at length upon the practical import of these reflex neuroses, and he gives expression to the same thought which I have so often enunciated—“that, however marked the causative relation in these cases, however well known the dependence of such reflex symptoms, practically this is ignored by the profession. The treatment in all cases is directed to the site of the symptom, and the patient is plied in vain with remedies, whilst a simple treatment, often a single application, might give relief if directed to the site from which the reflex emanates.” Unquestionably, these reflex neuroses, whatever be their nature, though theoretically accepted, are practically disregarded. It seems but natural that an organ so intimately associated in function and in nerve-connection with the genitalia, so susceptible to reflex irritation, should respond readily to uterine stimulus.

The most common of these bronchial hystero-neuroses appear in the form of an irrepressible cough, a dyspnoea more or less violent, and the asthmatic attack, although either of the morbid conditions to which the bronchi are subject may be simulated. A true reflex neurosis, however

<sup>1</sup> *Berlin klinische Wochenschrift*, No. 25, 1882.

violent, is always unaccompanied by structural changes, and may be demonstrated with the certainty of the laboratory experiment in cases where the determining uterine status can be removed and reproduced at will; for instance, if this be a non-adherent movable flexion, as in the following case, already cited as Case IX. in my first paper on the hysteroneuroses:

CASE XXIV. *Genito-reflex Dyspnœa; Uterine Asthma; Instantaneous Relief by Reposition of the Retroflexed Uterus.*—Mrs. S—— I first saw in consultation with Dr. Otto Greiner of St. Louis, by whose courtesy I am enabled to give the full history. The patient was an exceedingly irritable, nervous woman of forty-two, who had had four children; formerly healthy and strong, she had become emaciated to the last degree, with a careworn, haggard look; menstruation in former years was comparatively regular and unaccompanied by pain.

In October, 1875, she began to suffer from nightly attacks of asthma. When these attacks first appeared they presented all the symptoms of a nervous or hysterical asthma, with bronchial cough and expectoration toward the end of the attack as the asthma subsided. Coming every night soon after eleven o'clock, they would continue for an hour or more, according to their severity, and then disappear, leaving the patient entirely free from the annoying symptoms; but as the disease progressed her suffering became continuous, the trouble persisting, though in a milder form, throughout the entire day.

The case had gone from hand to hand, and the Pharmacopœia had been exhausted by the numerous physicians consulted; she herself, supposing a prolapse, had inserted various kinds of pessaries. From these facts, Dr. Greiner, when called in, suspected that the bronchial trouble might be in some way connected with a morbid condition of the uterus; and he was confirmed in this by the marked exacerbations a few days previous to the menstrual period, the bronchial asthma continuing unabated throughout the entire duration of the uterine congestion, and gradually yielding in intensity as the catamenial flow disappeared. The symptoms always abated more or less after the cessation of the flow, but continued throughout the intermenstrual period, again to become more violent at the approach of the next period.

Notwithstanding the grave symptoms, auscultation and percussion revealed but little, while upon vaginal examination Dr. Greiner found an elongated, acutely retroflexed uterus, movable and straightened by the probe without much difficulty. He introduced a sponge tent: the patient soon began to feel more comfortable, and in less than twelve hours the annoying cough and asthma which had so long troubled her entirely disappeared. An intra-uterine stem, ingeniously constructed to suit the case by Dr. Greiner, was next introduced, and as long as it



could be borne without irritating the mucosa the cough and asthma ceased.

The symptoms, as I have myself several times observed, would abate soon after the introduction of the stem, to cease entirely within a few hours, but upon removal of the instrument the former suffering was sure to return in from five to twenty-four hours.

The bronchial symptoms responded with the greatest certainty and regularity to a change in the position of the womb.

Retroversion pessaries did but little good, some even proving injurious; pressure, even the slightest, on the posterior wall of the corpus uteri caused intense pain and a fearful exacerbation of the symptoms, as was demonstrated by a glycerin cotton tampon which had been introduced with a view of elevating the fundus.

At last the stem could no longer be borne, and the patient's suffering became so unbearable at the time of the catamenia, while she was free from the asthma for two weeks of the intermenstrual period, that I determined to bring about the menopause by Battey's operation. I removed both ovaries, but the patient, enfeebled by long suffering, died on the sixth day after the operation.

The post-mortem examination showed the lungs to be almost normal, somewhat emphysematous, but the bronchi free, nowhere enlarged, their mucous membrane perhaps a trifle thickened; thus it was evident that the dyspnoea and the severe and continuous cough with muco-purulent sputum was a purely nervous phenomenon, and clinical experiment had shown the causation to be uterine.

CASE XXV.—An analogous case is related by Prof. Hegar of Freiburg.<sup>1</sup> The patient, a maiden lady, 31 years of age, had been troubled during the period of puberty with an annoying cough, which returned in her twenty-sixth year and grew constantly more troublesome; she complained of intense cervical and hypogastric pains, bearing-down and other uterine pains, loss of appetite, but, above all, of the hoarse, irritating, and constant cough, which was only temporarily relieved by the use of strong opiates; menstruation was profuse and painful. Examination revealed an ante flexion, with chronic metritis and oöphoritis.

The introduction of an intra-uterine stem pessary afforded almost instant relief from the terrible coughing spells, precisely as in my case, where it was used to overcome the retroflexion, and Prof. Hegar's further experience with the stem was perfectly analogous to my own. It seemed to act unfavorably in other ways, so that as the period approached he was obliged to remove it; in from three to four hours after the removal the attacks returned with all their former severity. The stems were used for several months, but although the cough was

<sup>1</sup> *Wiener med. Presse*, 1877, Nos. 14, 15, 16, 17.

checked the pain, irritation, and menorrhagia grew unbearable, and the use of the instrument was given up. Electricity, as well as all medication, failed, and the extirpation of the uterus and the ovaries was determined upon, as the condition of the patient was such that she must apparently soon succumb, and it was highly probable that the cough would subside upon removal of the uterus and ovaries. The operation was successfully performed, and up to the date of the writing of the article, three months after the extirpation, the cough has not reappeared. Similar cases are cited by Chrobak,<sup>1</sup> Grünewald,<sup>2</sup> and Tripier.<sup>3</sup>

Hodge gives a number of cases in point: after referring to that tired feeling of the chest and the nervous cough—the dry, the hard, and the paroxysmal cough coexistent with the irritable uterus—he cites several which are decided bronchial hystero-neuroses, as their dependence upon uterine disease is made clearly manifest.

CASE XXVI. *Genito-reflex Dyspnœa; Uterine Asthma, disappearing upon Relief of the Causative Uterine Disturbance by Conception.*—Mrs. X—, 48 years of age, had for many years been a sufferer from terrific attacks of asthma; was in no way affected by internal medication, but somewhat relieved by cauterization of the sensitive area of the nasal mucosa by my friend Dr. Glasgow, who kindly gave me the details of the case. Though somewhat ameliorated and diminished in intensity, the disease persisted until conception took place, when a perfectly healthy functional activity of the respiratory organs was re-established, and up to date, the eighth month of pregnancy, breathing has been perfectly normal, and no evidence, even the slightest, of the before so violent asthma has been observed.

CASE XXVII. *Bronchial Hystero-neurosis of Pregnancy.*—Mrs. X— consulted my friend Dr. Glasgow on account of a persistent asthma which had developed with conception, persisted throughout pregnancy, and was still continuing, then in the seventh month. The patient is a lady in whose family a disposition to asthma has existed; in other members of the family the attacks have been brought about by very trifling exciting causes: in one sister a slight cold appeared as the impelling cause; in another, a laryngeal trouble—both responding to proper treatment. The reflex nature of the attack in this instance was made evident not alone by the peculiar coincidence of its appearance with conception, but by the utter failure of constitutional and local treatment from which relief could be expected.

Whilst in the first case a displacement of the uterus, possibly a retro-

<sup>1</sup> *Wiener med. Presse*, 1869, Nos. 1 and 2.      <sup>2</sup> *Petersburger med. Zeitschr.*, 1875, p. 575.

<sup>3</sup> *Leçons de Forme et de Situation de l'Utérus, etc.*, Paris, 1874, p. 87, Observ. xxii., xxiii.

flexion or a narrowing of the canal, which had excited the reflex symptom, was overcome by the functional changes consequent upon pregnancy, and thus, the cause being removed, the bronchial reflex abated, in the second the physiological hypertrophy of the uterus due to pregnancy seemed to produce the irritation which resulted in the bronchial response: most likely with parturition, the emptying of the cavity, and the contraction of the organ the reflex symptoms will abate.<sup>1</sup>

CASE XXVIII. *Bronchial Hystero-neurosis; Cheyne-Stokes Respiration determined by the Menstrual Exacerbation of Chronic Uterine Disease.*—Mrs. C——, from Warrensburg, Mo., aged 26, consulted me in November, 1886. Examination revealed laceration of cervix and perineum, erosion of the congested and everted lips, retroflexion of the enlarged uterus, and metritis, endometritis, and oöphoritis. Intense backache was the only symptom characteristic of these morbid conditions, which resulted from a first and only labor three years ago, and which had caused complete nervous and physical prostration and a variety of reflex neuroses, prominent among which seemed those of the pneumogastric—pain in the heart, palpitations exciting a fear of heart disease, nausea, belching, distension of the stomach, and Cheyne-Stokes respiration: while cardiac and gastric symptoms persisted in a milder form, a violent exacerbation, together with a development of pulmonary symptoms, accompanied the menstrual congestion, the thoracic pain, and the peculiar respiration so characteristic of pulmonary disease, and I requested the opinion of my friend Dr. Glasgow in the case. Although the breathing was characteristic and the patient gave a history of repeated attacks of pleurisy and “lung fever,” he could detect no pathological changes, and assured Mrs. C——, as I had done, that her lungs were in a perfectly healthy state, notwithstanding the distressing symptoms. We observed this neurosis, which had appeared with the development of pelvic disease for the past year, during two menstrual periods; it was most intense, the peculiar respiration most marked during the violent menstrual attack following her journey to the city, by which the uterine symptoms had been aggravated. The period following, after the inauguration of treatment, and after the patient had had an opportunity to rest properly, passed off with all symptoms less severe.

As treatment progressed and the displacement was relieved, the inflammation reduced, the erosion healed, the bronchial neurosis ceased, likewise the cardiac. The gastric symptoms alone remained, but in a milder form. With constant improvement the menstrual

<sup>1</sup> Dr. Glasgow has kindly informed me since that his expectations have been realized—that the asthmatic attacks, which persisted throughout pregnancy regardless of treatment, ceased immediately after confinement, proving them to have been pure physiological reflexes.

pains constantly diminished, and the bronchial neurosis has never reappeared.

CASE XXIX. *Genito-reflex, Dyspnœa, and Cardiac Neuroses; Difficulty of Breathing; Palpitation of the Heart; Distension of the Stomach, resulting from Laceration of the Cervix and consequent Hyperplasia with Descensus Uteri; Persistent or Pathological Neurosis permanently checked by Galvanism to the Uterine Terminals.*—The patient, Mrs. H——, had been a constant sufferer from violent reflex neuroses excited by uterine disease, and her insomnia added to the bodily and nervous prostration. In this case the palpitation of the heart and dyspnœa were so marked that after walking fifty steps the patient had to keep her mouth open and gasp for air. She could not walk up a single flight of stairs without resting a few times, rarely attempting to walk two squares to market. The neuroses were constant or pathological, with a slight exacerbation at the menstrual period and after cold or exertion, by which the uterine disease was aggravated.

Before resorting to operation upon the lacerated cervix I decided to relieve the inflammatory symptoms with mild astringent applications to the endometrium, medication to cervix and cul-de-sac by powders and medicated cotton, and reposition of the uterus by the elastic tampon. As the uterine congestion diminished, discharge and erosion bettered, her suffering was lessened; she slept more and complained less of palpitation and dyspnœa; still, she was unable to walk up stairs or any distance on level ground with comfort. Believing that the hyperplasia of the uterus would be more readily reduced by galvanism, I resorted to electrolysis by galvano-puncture in addition to the before-mentioned treatment. A platinum needle attached to the negative pole of the galvanic battery was inserted to the depth of one inch into the indurated uterine tissue, the positive dispersing plate upon the abdomen; a current of 40 milliampères was employed for five minutes. Two days later the same treatment was repeated, and while still upon the table the patient gave a sigh of relief, and before leaving the room told me that she now felt well. I did not see her for three days, and when she returned she appeared in the best of spirits, completely relieved of all the annoying reflex symptoms. She slept soundly throughout the entire night; could walk any distance, even go rapidly up stairs without any discomfort. The dyspnœa had entirely disappeared, and by the operation undertaken soon after her health was completely restored.

The sudden disappearance of the violent neurosis in this case is evidently due to the sedative action of galvanism, as it is not possible that a single treatment could so suddenly cause so great an amelioration of the uterine disease as to remove the exciting cause of the reflex neurosis; but, as so pointedly shown in Case IV., in which the reflex neuroses, which persisted after the removal of uterus and ovaries, were relieved



by galvanic treatment of the irritated nerve-terminals, in which the molecular disturbance excited by uterine disease had continued after the removal of the exciting cause, so I believe in this case the morbid nerve-irritation was overcome by the galvanic current, and thus the reflex neurosis checked whilst the causative disease continued.

#### IV. THE GASTRO-INTESTINAL CANAL; REFLEX GASTRO-INTESTINAL NEUROSES.

Though not so strange or so striking as many of the other phenomena resulting from uterine disease, the reflex neuroses of the gastro-intestinal tract are important to the practitioner, especially on account of the frequency and occasional violence of the most common of these reflexes, the gastric neurosis of pregnancy. We will consider—

First, the hystero-neuroses of the stomach;

Second, those of the intestines.

1. *The Genito-reflex Gastro-neuroses.*—Fulness in the epigastric region, gaseous distension of the stomach, loss of appetite, belching, nausea, and vomiting—all the symptoms of indigestion, even of gastritis—may be determined by morbid or physiological changes in the reproductive organs. Like other neuroses, without medication these annoying troubles gradually disappear as the uterine disorder yields to local treatment; whilst before the inauguration of such treatment any remedies that may be given to ease the suffering caused by the apparent gastritis will be either fruitless or will at best afford but partial and temporary relief: sedatives and anodynes alone allay the intensity of the symptoms, and may even completely calm the nervous excitement. The semblance of disease is so perfect that unless the monthly recurrence or the existence of known pathological or physiological uterine changes be verified, a tentative treatment only will determine whether it be a mere phantom of disease or the result of actual pathological changes.

Gastric neuroses occur in response to physiological or pathological changes, and we need scarcely consider all the varieties, often trifling in character: the most important are the nausea and vomiting of pregnancy, often with fatal termination, and the gaseous distension of menstruation: belching, nausea, and vomiting as a menstrual neurosis, dependent upon the exacerbation of uterine disease with the monthly congestion, may be most violent in character. The diseased sexual organs may excite the gastric nerve through the sympathetic, and it is claimed by Jaffe<sup>1</sup> that the reflex vomiting is brought about by irritation of the vomer centre by a morbid stimulus imparted by reflex action to branches of the vagus or the gastric nerves.

The insidious control exercised upon the stomach by the reproduc-

<sup>1</sup> *Dyspepsia uterina, Memorabilia*, 1886, No. 4, Frankfort-on-the-Main.

tive organs is well marked by the frequency of the epigastric faintness which is a direct resultant of uterine changes, physiological and pathological. As Tilt expresses it, the vagus is a bridge which unites the central portion of both nervous systems, resembling both, not well isolated, often anastomosing with the sympathetic, which helps to form the cœliac plexus, so that affections of the vagus and the epigastric ganglia generally coincide, and the viscera by their ganglia react upon the brain, and a paralysis of the epigastric centres causes this uneasy sensation in the pit of the stomach, the feeling of sinking and faintness, nausea, weakness, and perverted appetite. Hyperæsthesia or paralysis of the solar ganglia and cœliac plexus may result from uterine disease. Tilt, however, over-estimates the frequency or importance of this gangliopathy, as he calls it. Though it may be more frequent in response to the changes of the menopause, it does not play so important a rôle as a reflex to uterine disease or the earlier physiological congestions. These spells of faintness, this sinking feeling of emptiness, which we also find in patients suffering from uterine disease, are a direct reflex occasioned by uterine or ovarian congestion, as is evident by their direct cessation upon an improvement in the uterine condition. Were they a mere resultant of constitutional debility caused by uterine disease, relief would not immediately follow local improvement, but would result only from an improvement in the tone of the system, which is but slowly effected after a cure of the pelvic disturbance.

This epigastric faintness, though annoying, is not of as much importance even during the menopause as it is supposed to be by Tilt, who finds it in 220 out of 500 of his cases, and claims that "women voluntarily unfasten their stays and clothing on account of their liability to gangliopathy; and for this reason many of my patients have left off their stays," he says—a striking example of an explanation suited to the wishes of the writer. This leaving off of corsets and unfastening of stays is not, in the main, to avoid the epigastric pressure, but to prevent that downward pressure of the intestines upon the reproductive organs, and of these downward into the pelvis, by which an exacerbation of uterine and ovarian symptoms is caused. Pressure from above is injurious, as descensus takes place when the patient is in the erect posture; and the hint is thus given by nature to the physician that he instruct his patients to avoid those dangerous garments altogether, and to support their clothing from the shoulders, that they may prevent this injurious pressure.

(a) *Constant, strictly Pathological Hystero-neuroses of the Stomach*—belching, nausea, and vomiting, caused by reflex irritation of the gastric nerve—are less frequently a permanent accompaniment of uterine disease; more commonly they are excited by the menstrual congestion. So closely resembling the various forms of dyspepsia and the well-

known gastric symptoms, they are usually treated as such, and, I regret to say, notwithstanding the strong arguments and the striking cases cited in my first paper, I seemed to remain alone in my ideas as to the causative relation of these phenomena. But lately the reflex nature of these symptoms has been more fully appreciated, as we see from the case cited by Jaffe.

CASE XXX. *Pathological Genito-reflex Gastro-neuroses: Symptoms of Gastric Catarrh, cured by Treatment of Existing Endometritis.*—Patient, 23 years of age, suffering greatly from nervous prostration, complained of heartburn, eructations, and vomiting after meals. Constitutional treatment was at first resorted to: iron and other tonics were given, but without effect. The stomach-pump even was tried, and showed a perfectly healthy condition of the gastric mucosa; the stomach was clear of secretions, not over-acid. The uterine symptoms, which had been neglected on account of their apparently trifling importance as compared to the gastric and constitutional condition, were now examined into and a douche was ordered. The stomach grew worse, evidently in consequence of the irritation caused by the examination. As the vaginal injection proved useless, local treatment was insisted upon; the uterus was anteflexed, the body enlarged, the mucosa diseased; the curette was resorted to for the relief of the endometritis, and the cavity thoroughly cleansed; the belching and vomiting ceased at once and the stomach was restored to a healthy condition, but after a time the dyspeptic symptoms slowly reappeared, not with that severity and without vomiting.

This is evidently a reflex neurosis, well demonstrated by the imperfect treatment of the case. Metritis and endometritis of long standing are not suddenly cured by a single curetting, although the diseased mucous membrane is much improved and an opportunity given for cure by prolonged treatment. With the improvement following the curetting the reflex symptoms ceased, but as the advantage was not followed up, the uterine condition again grew slowly worse, and with it the gastric neurosis reappeared. Had curative treatment been inaugurated immediately after the operation, a permanent cure would have been effected.

CASE XXXI. *Pathological Gastro-neurosis.*—Mrs. W——, aged 27, began to menstruate in her fifteenth year; has always been regular, with pain on the first day and a profuse flow. Married at seventeen, she bore two healthy children: she first began to complain six years ago of lassitude, headache, backache, and unusually profuse menstruation; at the same time gastric symptoms developed; her stomach was continually deranged, weak, with a feeling of fulness after taking any, even the lightest, food. She was under treatment for almost two years for the uterine derangement, but experienced so little relief that she

ceased all medication for the next two years, when her suffering increased, and she consulted me in the spring of 1875.

Combined with pelvic complaints were all the symptoms of a chronic catarrh of the stomach.

I found a slight prolapse of the tumefied, retroverted uterus, the lower lip elongated, hard, and nodular, and an eroded granulating surface surrounding the os; the bowels irregular, often bloated; during the menstrual period there was profuse and continued hemorrhagic flow, which I found it difficult to check. Suspecting a granular condition of the uterine cavity, I made a digital examination after dilating with sponge tents, and removed the excrescences with the scoop. The operation was followed by speedy recovery, and with the improvement of her pelvic suffering the distressing gastric symptoms disappeared, although I had before in vain sought to remedy the evil with bismuth, pepsin, nux vomica, and similar agents.

At a later date I was obliged to insert a Hodge pessary, as the retroversion became more marked and caused annoyance, backache, bearing-down pains, and a slight return of the stomach trouble; the instrument at once relieved both pelvic and gastric trouble, but at times, when she has not worn it for several days, her digestion again suffers.

CASE XXXII.--Several equally marked cases have been since reported. The first was by Dr. Wm. M. Chamberlain at a meeting of the New York Obstetrical Society, September 19, 1876.<sup>1</sup> In this case the point of irritation at which reflex action was excited is supposed to have been at the os internum, as this was the seat of a small fibroid which acted as a ball valve, and when it closed the canal the stomach trouble appeared: not medication, but removal of the fibroid, brought relief to the sufferer from so-called chronic gastric disease.

Patient 30 years of age, married. Has one child, now five years old, after the birth of which symptoms of uterine disease began to appear; during gestation the nausea and vomiting had been excessive; three years later she had gastric trouble, nausea, vomiting, and a boring, burning pain in the epigastric region; no food could be retained, so that for twenty-seven days she was kept alive by enemata. She slowly improved, and finally recovered.

This patient again became pregnant, and all the old symptoms recurred. At this time Dr. Chamberlain first saw the patient in the second month of her pregnancy, and finding the pregnancy to be complicated with large uterine fibroids, a smaller one being within the cervix, determined to produce abortion. He began dilating at 11 A. M., and at 7 P. M. vomiting, pain, and all other distressing gastric symptoms had ceased. They began to diminish in two hours, and five hours afterward she ate a hearty meal. When the cervical canal was open and

<sup>1</sup> *Am. Journ. Obstet.*, January, 1877, p. 98.



unobstructed, the patient was comfortable, but with every labor-pain, as the fibroid was forced down and the valve closed, the nausea, gastralgia, etc. returned.

Dr. C. justly remarks that the old trouble two years ago was undoubtedly uterine in its origin, as the last was distinctly proved to be.

CASE XXXIII.—The other case, a “sympathetic hystero-neurosis of the stomach,” by Dr. Formento of New York, appeared in the July number of the *American Journal of Obstetrics* of 1877.

Intractable vomiting and hysterical convulsions lasting for several years, caused by the indurated conical cervix with stenosis of the canal, were cured by incision and dilatation. The patient was a healthy lady of twenty-one, who had known no uterine suffering save a somewhat painful though regular menstruation previous to marriage. The vomiting, unaccompanied by any pain in the epigastric region or other symptom indicating organic disease of the alimentary apparatus, at first appeared soon after marriage, then coming only in the morning when the stomach was empty. It gradually became more frequent, coming at all times, before and after meals, often provoked by some unpleasant sensation or a slight moral impression. The patient soon lost flesh; there was extreme prostration with perversion of moral and intellectual faculties. Finally, these disorders of innervation went so far as to produce convulsions, with complete loss of consciousness, general and at times partial anæsthesia, or during certain attacks extreme hyperæsthesia; at times phenomena of catalepsy, or trismus, opisthotonos, contractions of pharynx, œsophagus, etc. These occurrences often took place several times during the month, menstruation continuing regular, neither more difficult nor less copious than normal.

Several physicians had been consulted: antispasmodics, tonics, hydropathy, electricity, sea-baths, mineral waters, blisters, morphia hypodermically, etc., had all been tried in vain. Dr. Formento found an abnormal sensibility of the external organs, a narrow vagina, a conical, hard, resistant cervix of a deep-red color and smooth surface; the external os scarcely visible and impermeable even to the smallest sound; the uterus normal in size and position.

The cervical canal was enlarged by bilateral incision in its entire length, especially at its two orifices, and before the incision healed the vomiting had ceased; the external genitals and cervix became more natural, the congestion disappeared, and a large sound could be readily introduced to the normal depth; all suffering was relieved, and the patient became cheerful, strong, and healthy.

This satisfactory condition continued for nine or ten months following the operation, when the derangements of the stomach and nervous system again began to appear. Upon examination the os and cervical canal were found to have become considerably narrower than they were

two months after the operation: this was now repeated, the same immediate and remarkable amelioration following and continuing for over a year; then, again, for the third and fourth time, the knife was resorted to. After a period varying from ten to sixteen months the return of the same disorders compelled Dr. Formento to have recourse to the same method of treatment, always with the same good result.

The symptoms in different patients necessarily vary, but more in intensity than in kind. I have cited these cases at length in order to elicit the gastric symptoms as they appeared in each, and more particularly to demonstrate the causative relation existing between the affections of the stomach and the uterus, and the dependence of these reflex phenomena upon chronic uterine disease. However frequently these cases have come under my observation, I have seen none more characteristic than those cited in my first paper.

(b) *Menstrual Hystero-neuroses of the Stomach*.—Whilst nausea, hicough, and vomiting may appear as menstrual hystero-neuroses, the most frequent of the menstrual hystero-neuroses is the gaseous distension of the stomach, accompanied by either pain, nausea, or vomiting—the menstrual hystero-neurosis of the stomach *par excellence*. It was the frequency of this peculiar symptom and its strict dependence upon the uterine condition which first called my attention to the reflex neuroses; and I believe that I am safe in saying that at least one-third or one-fourth of all female patients suffering from pelvic disease have this enlargement of the stomach at the time of the menstrual engorgement, so that this swelling, which appears not with the flow, but a few days earlier, with the uterine congestion, may be looked upon almost as an indication of the approaching catamenia. This neurosis accompanies almost every menstrual disorder, and yet it is not referred to in our textbooks, and it is but little known to the practitioner in its relation to the female sexual organs, so that a case of this kind when observed is usually treated as an indigestion or a gastritis. 64 of the 174 patients in the Female Hospital in this city in 1876 and 1877 suffered from the menstrual hystero-neurosis of the stomach—36 per cent. I made these examinations repeatedly at intervals of several months, examining indiscriminately patients from surgical, medical, venereal, and lying-in wards, and I always attained about the same per cent. 34 out of 94 patients examined in July, 1876, complained of the menstrual swelling, and when after a complete change of inmates the rounds were again made in August, 1877, 29 sufferers were found among 80 patients.

*Symptoms of the Menstrual Hystero-neurosis of the Stomach.*

Swelling only, or with pain and indigestion . . . . .	46 per cent.
Swelling with nausea . . . . .	19 “
Swelling with nausea and vomiting . . . . .	16 “
Nausea, often with pain, very slight swelling . . . . .	19 “

*Time of Appearance of the Symptoms in Relation to the Menstrual Flow.*

Immediately preceding, or together with, the appearance of the flow . . . . .	10.6 per cent.
1-2 days before appearance of the flow . . . . .	37.9 "
2-3 " " " " " " . . . . .	27.3 "
3-4 " " " " " " . . . . .	9.0 "
5-6 " " " " " " . . . . .	3.0 "
7 days, more or less, before the appearance of the flow . . . . .	10.6 "
In middle of intermenstrual period . . . . .	1.5 "

*Disappearance of the Neurosis.*

With appearance of the menstrual flow . . . . .	61.8 per cent.
On the first and second days of the flow . . . . .	25.4 "
With cessation of the flow . . . . .	12.7 "

*Duration of the Neurosis.*

Several hours . . . . .	3.7 per cent.
1-2 days . . . . .	11.2 "
2-3 " . . . . .	42.6 "
3-4 " . . . . .	14.8 "
4-5 " . . . . .	7.4 "
6-8 " . . . . .	20.3 "

SYMPTOMS.—The symptoms of this neurosis are somewhat varied; its appearance is, however, always ushered in by a distension of the epigastric region, more rarely of the entire upper part of the abdomen: the patient will always speak of the "swelling of the stomach," which often becomes so marked that the clothing must be very much loosened if it be worn at all. The enlargement is, in almost all cases, confined to the epigastric region, which is tense, sensitive to the touch, and extremely tympanitic. This flatulent distension is frequently accompanied by more or less pain in the stomach, cramps, and bearing-down pains, or cramps and pains passing from the stomach down into the back.

The backache and headache, or fulness of the head, which so often precede and accompany difficult menstruation, generally complicate the neurosis of the stomach.

In at least one-third of the cases (35 per cent.) nausea succeeds the swelling, and when once established continues until the cessation of the neurosis. In more aggravated cases the gastric discomfort is such as to produce vomiting, but this only when the neurosis is at its height, shortly before the flow, and it ceases, as all other symptoms do, with the appearance of the catamenia. In only 16 per cent. of the cases was the distension accompanied by vomiting, and then not regularly with every period, but only when all the symptoms were intensified. Sometimes we find indigestion, frequently anorexia, but in some instances a very good appetite, notwithstanding the nausea: the flatulent distension of the stomach as a reflex phenomenon is not neces-

sarily accompanied by that disgust for food which is a symptom of gastric disease.

*Time of Appearance and Duration of the Neurosis.*—This neurosis of the stomach generally (65 per cent. of the cases) makes its appearance from one to three days before the catamenia: beginning with the distension of the epigastrium, the symptoms increase and reach their climax just before the coming of the flow, and they disappear (62 per cent. of the cases) when the engorged uterus finds relief in the escape of the sanguineous fluid.

In some cases the symptoms do not appear until the coming of the flow (10.6 per cent.), and rarely are they found as early as the fourth (9 per cent.) or the fifth or sixth day (3 per cent.) before its appearance. In 10.6 per cent. of my cases they came on a week previous to the flow, lasting until its appearance, and in two cases in the middle of the intermenstrual period.

These gastric symptoms generally disappear at once when the menstrual discharge comes on; occasionally they continue until the flow is freely established on the first or second day (25.4 per cent.); less frequently (12.7 per cent.) do they last throughout the entire duration of the period. The average duration of the menstrual hysteroneurosis of the stomach is consequently from one to three days (54.0 per cent.), seldom but a few hours (3.7 per cent.); in 14.8 per cent. it was from three to four days, in 7.4 per cent. from four to five days, but again more often (20.3 per cent.) from six to eight days.

*Time of Development of the Neurosis.*—Only 34 of the 70 cases observed were carefully questioned as to the time at which the distension of the epigastrium in connection with the catamenia had been developed. Of these 34 patients, 25 (73.5 per cent.) had observed this more or less annoying symptom from the time they first menstruated, and it had returned regularly with each period, always preceding the flow, so that they had learned to look upon it as a part of the suffering to which they were doomed during the continuance of their sexual life. It is probable that for reasons such as this the advice of the physician is not often sought by women suffering with this trouble; and when he is consulted, as in several instances related to me, it is in aggravated cases, which are naturally looked upon as very serious forms of gastric derangement because his attention has never been called to the milder forms of this affection or to its causes and relations. It might be of interest to add that the age at which menstruation appeared varied greatly, ranging from the eleventh to the nineteenth year.

In the 9 other patients (25.5 per cent.) the neurosis appeared later in life in connection with uterine disturbances; 6 of these first observed the gastric suffering upon the reappearance of the menstrual flow after childbed, mostly when this had been aggravated by uterine inflamma-



tion. In one instance the swelling appeared at the same time with the development of uterine disease; in another after marriage, by which the congestion of the anteфлекed womb and all menstrual suffering was increased. And in only 1 of these 9 cases is no sufficient cause mentioned for the late appearance of the neurosis.

*Conditions under which the Neurosis is Found.*—My statistics are gathered entirely from women in the lower walks of life, as I was dependent for data and comparisons upon the 174 patients of the Female Hospital: these were mostly servants, quite a number were prostitutes, some housewives, seanistresses, and laundresses.

During the short space of time which has elapsed since my attention was first called to this point I have not been able to gather a sufficient number of cases in private practice to allow the expression of a settled opinion, but my impression is that the menstrual neurosis of the stomach is somewhat less frequent among the more comfortably situated classes.

The ages of those examined cover almost the entire range of menstrual life, from the fourteenth to the fifty-first year, and the diseases from which they were suffering at the time were such as will be found in a general female hospital.

*Connection with Uterine Disease.*

Cases in which the neurosis appeared . . . . .	63
Under treatment for uterine disease . . . . .	16
No uterine disease acknowledged . . . . .	47
Cases in which the neurosis did not exist . . . . .	111
Under treatment for uterine disease . . . . .	15
No uterine disease acknowledged . . . . .	96
Total number of cases examined . . . . .	174

Of the 31 cases in the hospital under treatment for pelvic trouble, 16 suffered from the neurosis; but as vaginal examination was not made in all cases, it is impossible to say how many of the other patients labored under some slight uterine difficulty unknown to themselves or not acknowledged to the physician.

Of the 7 private cases which I have recorded in my first paper as showing the menstrual hystero-neurosis of the stomach, only 1 was free from severe uterine disease.

In many of those cases of neurosis in which the patient did not complain of the symptoms of uterine disease an irregularity of menstruation was found; thus in 27 of 36 patients whose histories were more carefully recorded menstruation was decidedly abnormal, mostly irregular, or, if regular, profuse and of long duration or very scanty. In the other 9 the flow was perfectly normal; in 8 of these 9 cases the swell-

ing had been noticed since the first appearance of the courses, and had since then regularly preceded every period.

The cases in which menstruation is regular and normal are mostly the milder types of the neurosis, and in the mildest forms the flow is always regular.

The most severe cases, in which the epigastric swelling is very marked and painful, occur when the menstrual flow has been checked by some pathological influence in patients suffering from the neurosis; thus, a woman, now thirty-one years old, first menstruated at fourteen, and, affected with the neurosis since that time, did not see a return of the period until her eighteenth year, the flow having been checked by a severe cold. In these four years during which the menses did not appear the neurosis returned regularly each month, being more severe and causing her greater suffering than she had experienced while the flow was regular, both before it was checked and since its reappearance: her case is still one of the most troublesome. I find several other equally marked cases among the number recorded, and I deem them most instructive, as showing the dependence of the neurosis upon uterine engorgement.

In those cases in which a physiological cessation of the flow takes place, as in consequence of conception, I could detect no regularity in its effect upon the neurosis; thus the patient last referred to, whom I saw in childbed, tells me that her stomach was in a very fair condition throughout the entire period of pregnancy, and that she did not suffer from vomiting until the last month; another, who has suffered greatly from the neurosis since puberty, says that she had never felt so well as during the nine months following conception, and that her stomach had never before been in so good a condition; on the other hand, in some patients so affected swelling and tenderness of the stomach with vomiting always appear at the end of the first month of conception and continue throughout pregnancy, which may be brought to a premature termination by the suffering and debility of the patient if the medical attendant does not himself resort to the only means of relief—an early abortion.

I recall two marked cases of this kind, in both of which I was summoned in consultation on account of the excessive vomiting and gastric suffering.

The history told of menstrual hystero-neurosis; the courses had been missed in one case but once, in the other twice, and the suffering and vomiting dated from the period at which the flow was for the first time vainly expected. This at once led me to infer a conception, and I was enabled to verify the diagnosis: in one case I was obliged to relieve the uterus of its contents, after which the vomiting at once ceased.

*Causes of the Neurosis.*—I can adduce no better proof of my theory, that this gastric disorder is a reflex neurosis dependent upon a pathological condition of the uterus and a disturbance of its functions, than by citing the following characteristic cases :

CASE XXXIV. L. S——, aged 31, Bohemian ; healthy during childhood ; first menstruated in her fourteenth year ; has been regular, without pain or bloating ; married at twenty-three ; had five children. Since her last childbed, in 1873, she has been troubled with a swelling of the stomach at the time of her courses ; this precedes the flow by one or two days and ceases with its appearance. As the patient herself expresses it, she feels at that time “just as if she were in the family way ;” the stomach is distended and tender ; she is nauseated, has no desire for food, but rarely vomits ; is greatly debilitated by each attack of this kind, and has been incapacitated for work for several months, being often confined to her bed for days at a time. I saw the patient in May, 1876 ; the examination showed a prolapse of the uterus with elongation of the cervix ; operation was refused. I reduced the prolapse and retained it in place by a Hodge pessary, advising in addition to this the use of astringent cotton tampons. In October, 1876, Mrs. S—— returned, now a healthy, strong woman, earning a livelihood for herself and an idle husband by washing : the next flow after the introduction of the pessary passed off without the usual suffering, and *the hystero-neurosis has not returned since the uterus has been in place.* The prolapse also is so far improved that she no longer wears a pessary or tampon unless she is looking forward to an unusually severe day’s labor.

Others of the genito-reflex gastro-neuroses which are strictly due to pathological causes and cease with their removal appear during the physiological congestion of the catamenia, and hence resemble the menstrual reflexes proper. As an example of such neuroses I may cite some peculiar cases of perverted appetite, a gastro-neurosis which has by no means received the merited attention : the school-girl who refuses her wonted food, and, regardless of admonition and medication, endeavors to subsist on pickles, on bread and sugar, or other such unusual articles as her fancy may crave, is ridiculed, scolded, or punished as a wilful, disobedient child, while she is suffering from the effects of a morbid gastric stimulus due to puberty, some malposition or cervical catarrh, and physician and parents merely aggravate her condition by gross mismanagement.

Occasionally this peculiar symptom persists as the result of uterine disease, when it is of course attacked by gastric medication, but it is most frequent during physiological periods—during puberty, menstruation, and pregnancy : known to the ancients, known to the laity, as a resultant of conception, ever considered as a certain evidence of pregnancy, the physician of the present day still seeks to overcome this

reflex by gastric medication, instead of attacking the causative uterine lesion.

It is well known as a symptom of pregnancy, and cited as one of the early signs, and it is unnecessary to substantiate this by the rehearsal of familiar cases; less common is the pathological reflex, of which a typical case is appended:

CASE XXXV. *Ravenous Appetite accompanying Menstrual Congestion immediately before and after the Tripling Show; Amenorrhœa, Endometritis, Perimetritis; Relief by Local Treatment.* Gynecological Department, St. Louis Polyclinic.—Lizzie —, a colored girl 19 years of age, fairly developed, has never been regular; her menses, appearing in her fifteenth year, have always caused her great pain, with a slight, scarcely perceptible, flow, which has even diminished of late, coming for an hour or two only. The patient complains of back-ache, hypogastric pains, distension of the abdomen, and general languor; the uterus is small, retroverted, with an ante flexion of the fundus, and the still existing right perimetritis is probably the cause of all her troubles. Two days before the appearance of the flow, with the menstrual congestion, patient develops a ravenous appetite, eats constantly anything and everything within reach; roams about the house at night to seize upon whatever is available. If the flow continues for any length of time, the symptoms abate to return a day or two after. The girl has now been under treatment for two months; the endometritis is greatly bettered; the menstrual pains have diminished; the flow is increased in quantity; and the ravenous appetite has yielded to a normal condition.

CASE XXXVI. *Genito-reflex Intestinal and Gastric Menstrual Neuroses; Looseness of Bowels and Lack of Appetite during the Menstrual Period.*—The patient, a married lady 28 years of age, mother of two children, suffering from laceration of the cervix, metritis, endometritis, and chronic perimetritis; complains of looseness of the bowels with bad taste in the mouth, and lack of appetite during the entire menstrual period, from the second or third day before the appearance of the flow to twenty-four or thirty-six hours after its cessation. In this case also the symptoms yielded to uterine treatment solely, as was clearly demonstrated, since, for experimental purposes, no gastric or constitutional medication was resorted to, and the symptoms disappeared with improvement of the uterine disease upon local treatment alone.

It is only in the menstrual and pathological neuroses that we can so positively prove their reflex nature: the perversion of appetite and other gastric symptoms accompanying pregnancy we know only as concomitants of that condition, and not positively as reflexes, since we cannot always demonstrate their real nature: it is by abortion, the



inauguration of premature labor, only that this is done, and when accomplished affords indeed a striking proof. With mathematical exactness the most violent gastric symptoms cease in fifteen minutes, either with the dilatation of the cervical canal and the internal os by the dilator or sponge tent or after expulsion of the uterine contents. The remedy is far too severe to be recommended for general adoption, but when premature labor was inaugurated for other causes I have repeatedly observed the sudden cessation of such gastric neuroses.

The most available method of treatment when the physician has assured himself that the reflex is purely physiological, and not due to a tangible pathological cause, an erosion, a laceration, or similar lesion, is by sedatives administered internally or by the sedative action of galvanism upon uterine or gastric fibres.

(c) *Gastric Neurosis of Pregnancy*.—Unfortunately, the dependence of nausea and vomiting, the morning sickness of pregnancy, upon pathological or physiological conditions of the uterus, though theoretically acknowledged, is not practically accepted; and, notwithstanding the vast literature of the subject, notwithstanding the clear demonstration of the reflex character of those symptoms, the perverse treatment of earlier days is still persisted in, and the stomach is treated until the emaciated sufferer, after months of agony, is at death's door, when premature labor is inaugurated—often too late, however, to save life. If the determining cause is to be sought in the physiological congestion, it is possible that relief is to be obtained only by evacuation of the uterus; but if the gastric reflex is in response to a pathological change or its exacerbation by the physiological congestion, relief is readily obtained by local treatment, usually simple in its nature. That the nausea and vomiting of pregnancy is a reflex symptom is too well known to be in need of discussion or proof, and it seems indeed strange that it has as yet been impossible to establish a correct therapy and to do away with the totally irrational treatment by internal medication—the direct treatment of the gastric symptom—which appears to emanate from an ignorance of the true state of affairs. Whilst there is no objection to the giving of light sedatives, such as bitter-almond water or bromide of potassium, from which relief may be experienced, a cure can be expected with certainty only by treatment of the causative uterine condition.

It seems almost a parody upon the advanced state of modern medicine to see eminent authors still advising the let-alone treatment, conscious of the utter inefficiency of medication. They urge an expectant course unless the symptoms should threaten to become dangerous in their severity. Is this rational? Is it the course to be recommended in other maladies? I would strongly urge that the morning sickness of pregnancy, however light in its character, should be

relieved in its early stages. Mild sedative gastric medication may be attempted, but relief, speedy and certain, can be attained only by uterine treatment, which may be aided by gastric sedatives. The existing conditions must be noted, and any morbid deviations at once corrected, as it is impossible to say precisely from which particular condition the morbid stimulus emanates. A congestion of the cervix may be relieved by scarification; an erosion by a sedative or astringent application, an endocervicitis likewise; friction of the congested cervix against the vaginal walls, the floor of the pelvis, or the sacrum, by the elastic tampon; an astringent tampon may serve to contract the tissues. The dilatation of the cervical canal, at one time so highly recommended, should be one of the last resorts; and when all else fails the inauguration of premature labor is indicated, and the physician should never hesitate, as a life is at stake.

A rational course should be pursued, and our treatment should be consistent with our diagnosis, as is so clearly demonstrated by any and every one of the many cases of reflex neuroses here recorded. The morbid symptoms yield only to proper treatment of the causative morbid conditions from which the reflex impulse emanates.

2. *Hystero-neuroses of the Intestine*.—Flatulence, constipation, and diarrhœa may appear in response to uterine changes: on the one hand, the splanchnic nerves, coming from the sympathetic, may check or retard intestinal action, and on the other an influence more or less active is exerted by the glandular secretions under control of the vasomotor nerves, which answer so readily to genital changes. Whether diarrhœa is due to a hypersecretion of the intestinal glands or to an increased peristaltic action, as constipation is to muscular relaxation, I cannot say. Flatulence, and often distressing distension of the bowels, without diarrhœa or constipation, which appears in response to uterine lesions, may be likened to the most common of the menstrual neuroses of the stomach, the gastric distension. Flatulence or distension of the bowels may accompany uterine disease or appear as a physiological neurosis during menstruation, pregnancy, or the menopause. While I have observed violent diarrhœas during puberty, the most common intestinal neurosis, next to abdominal distension, is the diarrhœa, less frequently constipation, accompanying menstruation.

CASE XXXVII. *Reflex Intestinal Neurosis of Puberty*.—Miss H—, aged 15, under treatment for vesical weakness, is suffering from nervous prostration, probably due to rapid growth during this time of physiological functional development. The patient had been afflicted with habitual constipation, which yielded but slowly to treatment, for a few days before the appearance of the first flow. I believed that a natural action of the bowels had been accomplished and a healthy tone restored; the constipation seemed overcome. After the cessation of

the flow previously existing conditions were re-established. With the advent of the second menstrual period the patient was seized with a diarrhœa uncontrollable at times, so that I found her in tears from mortification at her distressing state: one passage followed another. This annoying reflex persisted during the two days previous to the flow, yielding to constipation during its continuance, and returning again for thirty-six hours after cessation of the menses. The third period was accompanied by the same symptoms, together with other reflexes, of which we shall speak hereafter.

Precisely the same condition was observed in the case of Miss B——, diarrhœa a few days before the catamenia yielding to the pre-existing constipation during the flow, with a return of the diarrhœa for two days after its cessation: costive during the intermenstrual period. This neurosis seemed to alternate with the pharyngeal neurosis: as the latter improved the former was intensified, both finally disappearing with treatment. This peculiar alternation of reflex symptoms I have repeatedly observed in patients suffering at the same time from gastric and bronchial neuroses, one growing worse as the other improved, always in inverse ratio. During the complete cessation of one the other was most intense. Our lamented friend, Dr. Albert Smith of Philadelphia, related to me several cases of diarrhœa and profuse mucous discharge from the bowel accompanying menstrual congestion in patients suffering from uterine disease.

Diarrhœa is by far more frequent as a reflex symptom than constipation. I have observed a violent diarrhœa during labor coming on with dilatation of the os, and ceasing suddenly with delivery. Constipation may occur, like diarrhœa, as a menstrual neurosis, with the uterine congestion. In all cases but the first mentioned, where the symptoms were not such as to warrant uterine treatment, the intestinal neurosis has responded promptly to uterine treatment, and with an improvement of the local condition the reflex symptoms have ceased. The same is true of flatulence and distension of the bowel when existing as genito-reflex neuroses.

CASE XXXVIII. *Hystero-neurosis of the Intestines (Bronchial Hystero-neurosis, Case XXVII.); Painful Menstrual Intestinal Neurosis; Localized Flatulence; Disappearance upon Treatment of the Uterine Disease.*—Perhaps even more distressing than the bronchial neurosis was a localized flatulence which preceded the appearance of the catamenia, passing away, like the bronchial neurosis, with the improvement of the uterine condition after treatment. With the appearance of the menstrual congestion came a flatulent distension of the left side, causing great pain, apparently by pressure: to the left of the stomach the abdomen appeared distended, tympanitic as if by a collection of gas either in the duodenum or at the juncture of transverse and descending

colons. So painful was this distension, which emitted a crackling sound, that the patient pressed her hand upon the part in agony, endeavoring with pressure and friction "to force the wind out," as she stated, pressing it to the right, and as it escaped relief was afforded. Medication had of course been repeatedly attempted by others for this agonizing pain, which had returned with each menstrual period for almost a year, but without success, narcotics only affording temporary relief, but after the inauguration of proper uterine treatment it soon ceased like other reflex symptoms.

## V. HYSTERO-NEUROSES OF THE EYE.

Notwithstanding the frequency of ophthalmic symptoms in connection with uterine disease, the definite causative and positive relation of these symptoms is by no means as yet well established: while it appears simple to determine their true nature, whether merely reflex or due to structural changes, by means of the ophthalmoscope, and by a tentative treatment if the ophthalmoscope reveals no morbid lesion, we are still greatly in the dark, strange as it may seem, since no organ is so clearly revealed to us as the eye, and in no organ are inflammations and morbid lesions so readily detected.

Whilst we know that patients afflicted with chronic pelvic disease usually complain of weak eyes or impaired vision, the relation of these conditions to each other is by no means well established: cases of ophthalmic disease are related as dependent upon uterine lesions (even by Mackenzie and Mayer, also by Von Graefe) which show a certain connection between the diseases of the eye and of the womb, but no reflex relationship: they are not neuroses, but cases of actual amblyopia in connection with amenorrhœa and dysmenorrhœa, caused by extravasation of blood into the retina during intense cerebral and pulmonary congestion, depending upon the retention of the menstrual flow. So also may we exclude those cases of amaurosis during pregnancy and lactation which are indirectly due to changes in the sexual organs, as they are found in connection with albuminuria and accompanied by actual lesions of the optic nerve.

The observing gynecologist will almost expect to hear patients suffering from chronic uterine disease, especially endometritis, metritis, and perimetritis, complain of weakness of the eyes, dimness of vision, or *mouches volantes*; and oculists assure me that the great majority of cases of asthenopia are found in females, many of them suffering from menstrual irregularities; yet, while tonics are given and an effort is made to invigorate the system, the ophthalmic lesions are treated as such without reference to the causative uterine lesions. Occasionally a patient is sent me by an oculist, usually one whom he has treated in



vain for a long period of time, and by reason of the failure of proper treatment in producing the expected result he supposes the lesion to be reflex in its nature, so indistinct is this relation as yet.

Ophthalmic symptoms, especially amblyopia, which need not be referred directly to a uterine condition, may occur in hysterical patients; but when transitory amaurosis or amblyopia appears at the menstrual period, the same symptoms recurring each month, we may look upon this as an hystero-neurosis, though the direct dependence can be proved only by the disappearance of the amaurosis upon the treatment of the existing uterine lesion. Decrease in the power of vision, dimness of sight as if from a cloud flitting before the eye, and *mouches volantes* occur both as menstrual and pathological neuroses, and are then relieved by treatment of the uterine disease, without interference of any kind with the ophthalmic lesion. Clement Meyer relates the case of a maiden lady aged 40 in whom the menstrual flow is ushered in by an amaurosis of several hours' duration, which disappears as suddenly as it comes, but is never accompanied by any of the symptoms of cerebral congestion—evidently a menstrual reflex, which would have yielded to proper uterine treatment.

In all cases of true reflex neuroses no structural changes exist, in the early stages at least, and the ophthalmoscope will reveal an absolutely healthy condition of the eye; but after a duration of years the disease heretofore simulated may develop in place of the phantom: in no organ is the persistent continuance of a reflex so liable to result in actual changes as in the eye.

Characteristic cases are those related to me by Dr. Barker, and reported in an earlier paper: hyperinvolution after a second confinement in a lady 30 years of age, with a cessation of menstruation, was accompanied by a severe pain in the eyes and dimness of vision. Careful examination by Drs. Agnew and Noyes failed to discover any pathological changes, and after successful treatment of the hyperinvolution by laminaria and sponge tents, later by galvanism, the menstrual flow was re-established, the uterus restored to its normal size, and, with the removal of the morbid condition of the uterus, the trouble of the eyes disappeared.

In another case, that of an unmarried lady 38 years of age, who consulted Dr. Barker on account of the severe headaches which had existed for four years, vision was impaired so that she could neither read nor write and could distinguish persons but very imperfectly: for a period of a few days in each month the headaches were even more intense and the patient suffered from diarrhoea and nausea—menstrual hystero-neuroses of the intestines and stomach. Examination revealed certain uterine inflammations: hot douches were ordered, sponge tents inserted, and leeches applied to the cervix at the time of the monthly

exacerbation. With the return of the flow the headaches disappeared; sight was entirely restored without resorting to any treatment whatsoever for the eye; and this has remained in a perfectly healthy condition ever since, now nine years, menstruation remaining normal, while in former years treatment of the eye had been vainly tried again and again by the ablest specialists. I have seen dimness of vision—never excessive, but frequently so as to prevent the patient's reading—*mouches volantes*, and the appearance of clouds, both as pathological and menstrual neuroses, frequently one eye only being affected, always upon the side of the most intense pelvic disease.

The lighter forms of ophthalmic disease which appear in response to uterine lesions yield but slowly with improvement of the causative disease if treatment is not inaugurated until after they have existed for some time; and it is only the more violent and rapidly-developing symptoms which respond as readily to uterine treatment as do the other reflex neuroses. It has appeared to me that the ophthalmic reflexes are much more persistent and yield more slowly than those on the part of any other organ; and if they have persisted for years they are very liable to result in structural changes and disease proper of the eye; which is not the case with other reflexes. This view is confirmed by the statement of one of our most able oculists, my esteemed friend Dr. Michel, who informs me that asthenopia, though first developed as a reflex symptom in response to uterine disease, is very liable to result in structural changes even though the causative lesion be overcome after short duration. This one reflex yields only to uterine treatment when quite recent in its origin. I have been unable to refer certain ophthalmic symptoms to individual uterine or ovarian affections, and hence I will only quote the statement of Rampoldi of Pavia,<sup>1</sup> who groups these various symptoms very positively, and refers each to a distinct pelvic disease. According to Rampoldi, these five groups of sexual diseases which affect the eye are as follows:

1. Hysteria and chronic perimetritis, he states, are causative of asthenopia, retinal hyperæsthesia, rarely of ptosis or anæsthesia of the retina.

2. Menstrual disorders: amenorrhœa he believes is causative of conjunctivitis, keratitis, iritis, and phlyctænia. To suppression of the menses he refers disease of the choroid, together with neuritis and retinitis, and says that they can only be improved after reappearance of the menses. The tendency to glaucoma is known to accompany a sudden suppression.

3. Inflammatory diseases result in hyperæsthesia and neuralgias of the trigeminus, protracted forms of iritis serosa, and sclerosis.

4. Pregnancy causes the difficulties accompanying the albuminuria

<sup>1</sup> *Annales universelles de Médecine*, September, 1881.

of pregnancy; amblyopia and amaurosis have been common from three to fourteen days after hemorrhage.

5. Lactation and the puerperium cause panophthalmitis and many diseases resulting from weakness and debility, ulcers of the cornea, retinitis, retinal hyperæsthesia, photophobia, and disturbance of accommodation.

I cite these diseases, which are here considered as cause and effect, but, though they may be so, certainly but few are reflex neuroses; and though Rampoldi has observed in individual cases these ophthalmic lesions in connection with the pelvic affections mentioned, I do not believe that any such positive relationship of individual phases of uterine disease to ophthalmic lesions can ever be established.

CASE XXXIX. *Pathological Genito-reflex Ophthalmic Neurosis; Glaucoma, apparently resulting from Uterine Disease, appearing with Structural Changes after long duration.*—Mrs. H——, 40 years of age, has suffered for the last fifteen years from the results of laceration of cervix and perineum, with consequent descensus, subinvolution, metritis, and left perimetritis. Had been under treatment, had even been subjected to operation, without benefit: after coming under my care improved slowly under treatment preparatory to operation. While she was hesitating with regard to the time of operation after the inflammatory symptoms had been reduced, violent exertion caused an exacerbation of the cellulitis in the left side, and household cares have since then, for the past year, prevented persistent treatment. Since that time she began to suffer from pain and weakness in the left eye, which always yielded to improvement in the uterine condition, and, though intense, was usually relieved by the application of electricity to the uterus; however, the change, moving into a large new house, necessitated physical exertion and was accompanied by a good deal of excitement, and at that time the ophthalmic pain grew intense, recurring periodically at nine or ten o'clock each night. I now referred Mrs. H—— to my friend Dr. Michel, who was unable to detect all the characteristic marks of glaucoma, and yet took the case to be such, and not a pure reflex, from certain structural changes, though in the first place the symptoms may have been aroused in response to uterine irritation. This case is one of those in which structural changes seem to have followed the simple reflex symptom, the phantom to have yielded to the disease.

CASE XL. *Ophthalmic Reflex; Photophobia, alternating with Dimness of Vision, mainly in the Left Eye; Retroversion, Endometritis, and Left Cellulitis.*—Miss B. M——, aged 21, subject to neuralgic headaches, was prostrated by undue physical exertion and afflicted with a displacement of the uterus and periuterine inflammation. Patient improved under treatment, but fright and exertion, running to avoid a herd of cattle dashing through the street, caused an exacerbation of

the cellulitis, while under intense mental strain, caused by annoying family circumstances, the dimness of vision which had heretofore existed, and had greatly improved with the improvement of the uterine disease by treatment, now returned, and added to this was a violent photophobia, at times accompanied by intense pain in the eye. Rest, poultices, and the hot douche brought about an improvement in the uterine condition and a disappearance of the photophobia. The haziness and dimness of vision will, I trust, again yield as soon as treatment can be resumed.

CASE XLI. *Weakness of the Eyes; Dimness of Vision; Laceration of the Cervix; Operation; Cure.*—Patient, Mrs. R—, was referred to me by an oculist after an unsuccessful treatment for several months at a time during the past year. The reflex nature of the ophthalmic disease had been suggested to the physician by the complete failure of treatment in the comparatively simple case. The uterus was enlarged, retroverted, the cervix lacerated, the lips everted and eroded. After a brief treatment the operation was performed: during convalescence reading was prohibited, which was the only precaution taken and the only advice given in regard to the ophthalmic trouble; her sight at once improved, her eyes gained strength, and progress was such that all symptoms disappeared in a month after operation.

CASE XLII. *Menstrual Weakness of the Eyes.*—Miss H—, who had never before suffered from her eyes, complained, upon the appearance of the first menstrual period with the advent of puberty, of a weakness of the eye and an irritation of the lids in the outer angle, a small crust appearing in the corner which felt sore, so that she could not well open her eyes. This symptom appeared for the first time with the advent of the catamenia, and has returned now for the fourth time with each menstrual period, coming shortly before the flow and disappearing with its cessation. As but little suffering was experienced, no examination was made, and I have attempted to approximate a healthy functional activity by the precautionary measures adopted—avoidance of exposure, regulation of bowels, warmth, and rest in bed during the period.

CASE XLIII. *Mouches volantes; Pain and Weakness of the Eyes, especially the Left, corresponding to the Left Cellulitis.*—Mrs. S—, 28 years of age, married three years, sterile, had been under treatment for a supposed uterine tumor which proved to be a perinterine deposit. With the aggravation of symptoms by misdirected treatment her eyes began to fail, until she was no longer able to read on account of the dimness of vision and the intense pain, at times black specks floating in the line of vision. The disease had existed nearly two years when she first came under my care, and an endometritis had developed in the displaced uterus, which was fixed in a position of retroversion with the



fundus in the left side. At home she was not under the most favorable circumstances, and improvement was exceedingly slow: unable to work, unable to read, her condition was a trying one; but her eyes were not alone weak: they troubled her so that I referred her to an oculist, in hopes that something could be done contrary to my own expectations. No structural changes were detected; still, an independent treatment was inaugurated: the use of weak glasses for a short time each day, tonics and local applications gave no appreciable relief, and improvement did not take place until a decided amelioration of the pelvic trouble had been obtained. Finally, with the improvement in the uterine and circumuterine inflammation her eyesight improved.

The direct relation of ophthalmic symptoms to the pelvic disease in this case was marked not only by its coming and going with the development and cure of the uterine inflammation, the negative results of local examination and treatment, but also by the effect of certain pelvic applications upon the eye: an application of iodine to the uterine cavity or the application of a tampon of iodized cotton to the cervix caused a burning, a reflex neurotic symptom, in the left side of the head and in the ball of the eye, with a feeling, as she expressed it, as if the eye was being pushed out. Within fifteen minutes after the application of the iodine to the uterine cavity this postophthalmic pain and this feeling of distension, pushing out of the eye, come on, and continue until the iodine effect passes off. This reflex appeared so strange that I repeatedly made the application to test the correctness of the observation, and often unbeknown to her; the same symptoms, however, appeared each time, whilst no other uterine or intra-uterine application produced any unusual results.

Amblyopia with complete amaurosis may occur in the healthy eye as a well-marked reflex; and these symptoms respond as readily as the less threatening neuroses to every vacillation of the causative uterine ailment; thus I recall the case of a young lady 24 years of age, suffering from endometritis, cellulitis, and amenorrhœa, in whom an amblyopia followed by amaurosis appeared with an exacerbation of the uterine disease, which was always improved by uterine treatment. No structural changes having been detected by ophthalmoscopic examination, no local treatment whatsoever was resorted to. As the patient is not a resident of the city, I have not been able to treat her continuously, but whenever it was possible for her to come to the city and place herself under my care for three or four weeks her eyesight was always improved, as were the direct pelvic symptoms, a cure being out of the question on account of existing pulmonary trouble.

The eye is perhaps the most important organ for the study of the reflex neuroses. Since the ophthalmoscope so readily detects even the most delicate structural changes, we can draw the line between struc-

tural changes and reflex symptoms, not alone by the practical test of treatment applied to the causative disease of the uterus, but also by observation of the condition of the eye itself: by a harmonious co-operation of gynecologist and ophthalmologist the true nature of these puzzling and deceptive symptoms may be determined in this transparent organ, and the disease distinguished from its phantom. It is possible that by the aid of the ophthalmoscope we may learn to trace to their true source those confusing symptoms in which structural changes—disease proper—secondary pathological changes, or sympathetic lesions and purely reflex symptoms, converge: symptoms precisely alike to the superficial observer may exist as disease accompanying uterine changes, and independent of these they may result from the congestion or the increased quantity of blood due to the stimulation of the circulatory system by pregnancy—as resultants, we might say, of the uterine congestion; or they may appear as simple reflexes without any structural changes whatsoever: this the ophthalmoscope must determine and gynecological treatment must prove. The true cause of ophthalmic symptoms once recognized, the study of those emanating from other organs will be, to say the least, greatly facilitated. Barnes, in the paper already referred to,<sup>1</sup> says: “Certainly the eye in pregnancy supplies many most interesting facts, which are of the utmost value in extending and controlling the conclusions derived from other sources of investigation; for example, amaurosis is generally connected with structural change or degeneration of the retina, but there is a form of amaurosis not seldom associated with albuminurie eclampsia which may end in complete recovery.”

I have seen such cases, and one has been recorded in the *Archives de Tocologie*, 1876. On the other hand, the lesion thus arising is in some cases permanent; and in these cases we may see the disease manufactured quickly under conditions more simple, more precisely defined, therefore more instructive, than under any other circumstances: in other words, the amaurosis of pregnancy may occur as a simple reflex in response to uterine distension and engorgement, or it may appear as a resultant of renal disease caused by pressure of the enlarged uterus or by renal congestion.

## VI. HYSTERO-NEUROSES OF THE JOINTS.

While hystero-neuroses of the joints are not frequent, they are extremely annoying, and many most puzzling reflex symptoms due to uterine disease, some of the so-called hysterical joints, are undoubtedly true hystero-neuroses. While all possible treatment is vainly tried, a careful examination of the reproductive organs would undoubtedly

<sup>1</sup> *Transactions of the American Gynecological Society*, vol. i. p. 150.

reveal morbid changes of some kind, and their proper treatment would readily relieve the heretofore unmanageable symptom. Professor Erb in the twelfth volume of *Ziemssen* has an excellent article on neuroses of the joints, but he barely refers to such as are distinctly due to uterine disease. Unfortunately, their reflex symptoms are still confounded with those due to so-called hysteria. The articular reflex symptoms which may be confounded with disease proper I have seen mainly in the hip and knee, less frequently in ankles and wrists. So deceptive is this neurosis that I recollect one case of a young girl at puberty who was brought to my father for examination in the early years of my practice. She had been seen by our prominent physicians and surgeons, had been under trying treatment for disease of the hip, but no improvement had taken place. The most careful examination, at which I assisted, failed to reveal disease, and yet the symptoms were all present. It was long before my attention had been called to these reflexes, and the later history of the case is unknown to me. Undoubtedly, it was an hysteroneurosis of puberty, as I have since observed it, yet never again so deceptive, simulating disease so perfectly, without any indication of existing pelvic trouble, as the reproductive organs were not considered in this case, the menstrual function not yet having made its appearance; yet this retarded development is, and was here, a most fruitful source of neurotic phenomena of various kinds.

Examination under chloroform will of course at once solve the mystery; and in a young girl this is the course indicated, examination of uterus and ovaries being admissible only after the reflex nature of the symptoms has been assured and constitutional treatment has proved ineffectual.

CASE XLIV. *Genito-reflex Neurosis of the Knee; Laceration of the Cervix and Perineum; Endometritis; Relief after the Second Application.*—Mrs. T——, aged 41, came to me in June, 1887, on account of annoying uterine symptoms. She had been in good health and free from pelvic symptoms until after the birth of her third child, eight years ago, when she was confined for months by a severe attack of puerperal fever, which terminated in a pelvic abscess. The symptoms of uterine disease began to develop; these were increased by the next labor, one year later. Her condition grew worse, and three years ago an operation was performed upon the cervix and perineum, after which her general health improved; the local symptoms were very much lessened, but it appears that, as the patient felt well, she neglected all precautionary measures and continued in her usual course of life. Not alone did the uterine inflammation return with increased severity, but in addition to the other previously existing symptoms—backache, hypogastric pains, and pain in the top of the head—came an annoying nausea and flow of saliva from the mouth. She again sought medical advice, and

an endometritis fungosa was discovered, complicating the relapse; and to this the recently-developed reflexes, nausea and salivation, must be referred; and this supposition proved to be correct: a great amount of hypertrophied mucous membrane was removed with the curette, and immediately thereafter the nausea, vomiting, and salivary flow ceased. No after-treatment followed, and ere long a lameness of the left knee became apparent; the patient walked like one suffering from an ankylosis of the knee-joint; the pain she described as being in the joint itself, and her walk was characteristic of an articular lesion. This last operation was performed in January, 1887: the gastric reflex ceased at once, but the neurosis of the knee appeared soon after, and has been growing gradually worse ever since in proportion as the uterine symptoms increased. The curetting was well timed, and by it the cause of one reflex was removed; had a proper treatment of the uterine and periuterine inflammations followed at this opportune time, a perfect result might have been achieved; but as no further assistance was offered, and the patient herself, being relieved, of course did not demand it, only one of the various morbid conditions was removed.

The patient came to me May 31, 1887. I found a deep laceration of cervix and perineum, the uterus very low, enlarged, the cavity wide, an active endometritis, a deep cervical laceration, mainly to the left, with a left chronic periuterine inflammation and an induration of the tissues, probably referable to the cellulitis in the puerperium eight years ago. I resorted to negative electro-cauterization of the uterus for relief of the endometritis, 40 milliamperes, four minutes, platinum sound in uterus, medium plate with positive pole on abdomen: this was followed by an application of 25 per cent. carbolic acid to the endometrium, iodoform and iodine tampons to the cervix, the uterus being supported by elastic astringent tampons. The pain in the knee thereupon diminished and her walk improved. The treatment was repeated June 2d, and again June 4th. The menstrual period came on with less pain, and upon return for treatment on June 15th the pain in the knee had ceased and her walk was but little impaired. The case is instructive, as it shows well-marked reflexes of different organs, each dependent upon one distinct uterine lesion, and the correct instinct of the patient is revealed: medical advice had never been sought, as the patient had correctly diagnosed her own condition, having suffered from a gastric neurosis; and, observing the direct dependence of this symptom upon the uterine condition, she supposed the stiffness and pain in the knee-joint to originate in the same way, especially as it was worse when the pelvic pains increased. To obtain some relief at least, she had tried all possible innctions and liniments, applications which had been recommended, but without any benefit; even blisters were used. I was surprised to see the ready yielding of the neurosis to the slight improvement in the



extensive and severe pelvic condition, and attributed the improvement to the electricity.

CASE XLV. *Genito-reflex Neurosis of the Hip*.—Miss S—, a young lady of 20, has the appearance of great suffering; she complains of leucorrhœa, backache, headache, and weakness of the eyes, of great tenderness and pain in the hip, and the feeling that one leg is shorter than the other, “as if all the tendons were stretched.” The pelvis is inclined to one side; she favors the afflicted limb, and her position, whether erect or reclining, is that of a person suffering with hip disease; none of the characteristic symptoms of this disease are wanting, with the exception that there is little or no pain upon direct pressure on the joint, but that the sensitive spot is above the joint, on and below the crista ilei, behind the anterior spine; pain in the knee, rotation and position of the foot, etc. are all well marked.

I was somewhat astonished to find that Miss S— was fond of walking, and, although fatigued, would not complain of increased pain in the hip after exercise.

Dr. Sims kindly consented to see the patient with me: permission was granted, and a careful examination of the pelvic organs was made; the uterus was found normal in size and position, somewhat congested, showing erosions and marked endometritis. The uterine symptoms, and, as we thought, all others, were now explained: local treatment was not allowed, but by the use of tonics, astringent injections, etc. the uterine symptoms have improved, and at the same time the hip trouble has become less annoying; and I expect to overcome it entirely as soon as I shall be enabled to resort to uterine applications. Of late the reflex nature of the disease has become more apparent by exacerbation at the time of the menstrual period.

CASE XLVI. *Pathological Reflex with Menstrual Exacerbation; Violent Contraction of the Joints; Laceration of the Cervix; Operation; Cure*.—Mrs. C—, aged 29, II.-para, though annoyed for years before her marriage by a persistent leucorrhœa and dysmenorrhœal pains, had never complained of pelvic weakness; in her first confinement cervix and perineum were lacerated, and the cervical tear aggravated in the second. Of nervous temperament, she became the victim of distressing reflex symptoms, suffering almost continuously from a headache, which finally culminated and centred in intense pain in the left temple. In place of the usual symptoms in the back of neck and head, pain and pressure, she had a feeling of drawing up, which caused such suffering that she was obliged to let down her hair and seek every possible means of relief. Her memory was impaired; gastric neurosis was marked—distension of the abdomen, with belching of wind and vomiting. These symptoms were greatly intensified during the menstrual period; so also was the pain in the side and across the small of the

back, which became excessive at this time. With the menstrual congestion came a blinding headache and attacks, during which she lost consciousness, marked by violent motion in all joints, a jerking of arms, kicking, so that constant watchfulness on the part of her friends was necessary to prevent injury to herself. The attacks were so severe that hypodermies of morphine were tried after milder sedatives and nervines had failed; but this morbid reflex did not abate until the giving of morphine was supplemented by chloroform and the patient had been kept under its influence for an hour or more. Local treatment, followed by improvement in the uterine condition, lessening of the discharge and of the menorrhagia, did not affect the reflex symptoms, which in no way abated.

I saw Mrs. C—— in consultation with my clinical assistant, Dr. F. C. Ameiss, the attending physician, who had repeatedly urged operation. Treatment proving unavailing, the patient finally consented, as her suffering grew unbearable, the headaches more intense and almost permanent, the menstrual exacerbations more severe. The operation was performed March 20th, and upon recovery from the anæsthetic a remarkable change was noticeable: the patient was quiet, free from pain, her headache gone, no more nausea, not even from chloroform, and during the night natural sleep in place of the trying insomnia from which she had heretofore suffered.

The reflex nature of the symptoms in this case, and their dependence upon the laceration, were most strikingly demonstrated: in no way affected by the successful treatment of the inflammatory condition, cerebral, neurotic, gastric, and joint symptoms all disappeared with the closing of the cervical tear. Two months after the operation the family birthday gave rise to unnecessary excitement and exertion, and in consequence a slight return of some of the previous symptoms—belching, with a slight nausea and some pain in the head. These disappeared after a day's rest, and the patient is now in the full enjoyment of health, her memory as good as ever; she sleeps well and is free from pain; a cheerful disposition has taken the place of the irritable temper which had before rendered home-life unbearable.

Whether these violent motions are properly referable to the joints or to the spinal nerves I will not decide.

CASE XLVII. *Pain in the Ankles from Persistent Irritation of the Uterine Fibrils after Removal of Uterus and Ovaries.*—Case XVII., referred to as an example of nerve-pains in ankles and soles of the feet, incapacitated at times from walking, partially by the pain in the soles of the feet, partially by the pain in the ankle-joint, relieved by the sedative action of electricity upon the pelvic nerves.

A most peculiar neurosis, which I have only twice observed as a cracking of the joints, which has appeared as a well-marked reflex in

one instance only in a patient suffering from retroversion with metritis and endometritis, laceration of cervix and perineum, who noticed a peculiar cracking in elbow- and knee-joints on the right side, upon which the most severe pelvic symptoms existed. These symptoms yielded to improvement in the uterine condition upon local treatment after having continued for a twelvemonth.

In the following case I was not able to positively demonstrate the reflex nature, but relate the history as one of the most striking on record:

CASE XLVIII. *Cracking of the Joints, with Hystero-neuroses of Stomach, Heart, Eyes, and Breast; Metritis, Endometritis, and Perimetritis; with some improvement in the pelvic disease after energetic treatment, the symptoms diminished in intensity.*—Mrs. Dr. L—— is afflicted with severe pelvic disease brought about by exposure to cold, by being driven from her home by fire on a winter's night while the ground was covered with snow: all the pelvic viscera are affected; the uterine canal is tortuous, adhesions forcing the organ to right and left; ante flexion with lateral flexion; metritis, endometritis, chronic cellulitis; moreover, the condition is complicated by the existence of a floating kidney on the right side; nausea and vomiting are constant, mainly at night, but most distressing during the menstrual congestion, which is relieved by only a very slight show. The neurosis of the eyes is marked; the pain in the breast intense during the catamenia. While the gastric neurosis is intense even during the flow, certain of the symptoms, like the painful drawing in the back of the neck, almost resembling opisthotonos or the pain of cerebro-spinal meningitis, cease with the appearance of the bloody discharge.

Since the intensification of the pelvic disease the patient has observed a cracking of the joints so marked that in walking up stairs the cracking of the knee-joint is audible some yards, and the same sound can be heard in elbows and wrists; even motion of the eyelids during exacerbation of the symptoms produces a crackling sound. The uterine and ovarian disease being so intense and of so long standing, I was unable to attain much improvement, and suggested oöphorectomy as the only possible means of relief. This was not acceded to, and, as the improvement was but slight, I cannot positively refer the cracking of the joints to the pelvic disease, but believe it to be a reflex symptom, as it was proven to be in the case before mentioned, in which it existed, however, in a very slight degree.

The stiffness of the leg which occasionally appears as a concomitant of cellulitis or ovarian inflammation, and which may present the characteristics of a reflex hystero-neurosis, must not be mistaken for the same, as it is usually directly due to pressure upon the main tract of the nerve or vessel by the displaced or enlarged viscera, and often by a

pathological mass in the side of the pelvis ; hence we find this stiffness always upon the same side with an existing cellulitis, ovaritis, or neoplasm. A case in point is that of a lady now under treatment suffering from trying cerebral reflexes, but at present very much weakened by a cellulitis brought about by misdirected treatment at her home. The uterus is enlarged, inflamed, slightly drawn to the left side, which is the seat of a cellutitic effusion. The menstrual period is one of great suffering, and the flow is always predicted by the beginning stiffness of the left leg, which precedes its appearance by two days. The stiffness begins forty-eight hours before the catamenia, increases until it reaches its height shortly before the appearance of the flow, to pass off slowly with its cessation. The leg is constantly weak, but this weakness is greatly increased with the stiffness during the period.

## VII. DERMATOSES ; REFLEX DERMATIC NEUROSES.

The pigmentation of the skin during pregnancy has been one of the few symptoms generally noted which link the diseases of this large surface to the reproductive organs. So little has the direct causative relation between the morbid conditions of the skin and uterus and ovaries been suspected, so little plausible did it seem, that the remarkable and noteworthy investigations which have lately been published have received but little attention. Unquestionably, the persistency of many dermatological conditions is referable to their nature, but in some cases it is due to the fact of their being genito-reflex neuroses, and, like other reflex conditions, these are intractable, yielding only to a removal of the cause : it is perhaps more difficult to arrive at the true nature of these reflex dermatoses, as they receive but passing attention from the gynecologist, being noted only as accidental accompaniments of uterine disease ; and the dermatologist, though he may suspect their dependence, is not in a condition to demonstrate this, and suspects it only from the failure in his treatment. Ten years ago I received but an unsatisfactory response to my inquiry among dermatologists. Dermatoses had indeed been observed with exacerbation during the menstrual period, occasionally appearing only during the catamenia, but their direct dependence upon uterine disease was questioned. Whilst the pigmentation of the linea alba and of the areola was recognized as an evidence of pregnancy, the sallow complexion of uterine disease and the peculiar facies of cystic degeneration of the ovary were referred to degenerated nerve-action, to imperfect circulation, to inability of the morbidly influenced centres to promote the healthy performance of nutrition, or to a reduction in the number of the blood-corpuscles. The folly of such a theory is readily recognized by the close observer, who



has seen the sudden change of complexion after an operation upon the cervix or after the removal of a diseased ovary. Even while the patient is still in bed, before recovery has taken place, the sallow complexion of disease has yielded to a fresh, healthy appearance. It is a true neurosis, but the genito-reflex neuroses of the skin differ from all others in the fact that they represent actual change, the disease and not the phantom; thus we have pigmentation, pustules, acne, erythema, in no way differing from the disease proper, which yield to treatment of a causative uterine disease or appear only with its exacerbation during the menstrual period, but prove intractable to local medication. I speak of them as dermatoses, as neuroses of the skin, because we may so most readily classify them. They are equally referable to the circulatory and glandular systems, as they are, in fact, the result of vascular changes, and must be traced to the vaso-motor nerves; hence they resemble the symptoms which I have considered as vascular, the flushes, sweats, etc. The vaso-motor nerves, by their direct connection with the uterine fibres and ganglia, must serve to explain these peculiar symptoms, which are in fact dermatoses dependent upon pathological and physiological changes in the reproductive organs, rather than simply reflex nerve-symptoms, simulating disease without the structural changes of disease proper.

Tilt finds prurigo and eczema in intractable and recurring forms during the menopause. Others have observed the frequency of erysipelas at this period, recurring frequently during two years until perfect cessation even after long intervals, to cease entirely with an attack five years later. Erasmus Wilson does not consider women very liable to cutaneous disease at the menopause, though he believes these obstinate if they do occur. Unquestionably, we have equal if not more reason for these reflex symptoms during the entire menstrual life of woman than at this particular period. Acne rosacea, lichen, pruritus pudendi, nettle-rash, have been observed during the menopause in patients never before afflicted with cutaneous disease; but how little the true nature of the reflex neuroses has been appreciated is evident from the constant placing side by side of coexisting or resulting diseases with the reflexes. Alibert has observed a cutaneous eruption in a patient during the menopause who had been afflicted with the same eruption during puberty, and who had been free from any similar affection during the entire intervening period of her life—a recurring reflex precisely as I have described it in other organs. Behrend in his work on diseases of the skin has more fully recognized the reflex nature of certain dermatoses than any other author hitherto, and yet he appears to regard them, as he distinctly states, rather as symptoms of the same morbid condition, and is extremely incredulous as regards their true reflex nature, looking upon them in part as a vic-

rious menstruation; but he honestly states that he has not as yet been able to determine the precise relationship between the cutaneous and uterine conditions. He has most correctly observed the frequency of eruptions during periods of pathological change in the uterus, and says "that it is a well-known fact that many of the sexual changes in woman are accompanied by morbid conditions of the skin—that they appear together with disease of the uterus and its annexa or with physiological changes." It is not uncommon to see women afflicted with metritis, oöphoritis, and uterine displacement suffering from persistent eczemata or urticaria which does not disappear until the uterine irritation subsides or the displacement of the uterus is relieved; so also irritation of the uterus by pessaries or applications causes such eruptions. Most common, however, is the pigmentation, especially in the face, as a concomitant of chronic uterine disease or neoplasm. The same dermatoses are also observed, together with physiological changes, in the reproductive organs, but, as he truly says, gynecologists have not yet paid sufficient attention to these cases, and he himself is not in a position to give a plausible explanation of the relationship between diseases of the skin and the genitalia; hence he has confined himself to a description of those diseases of the skin which accompany menstruation, and has classed them with the eruptions resulting from medication and vaccination, though he concedes that there is no kinship. According to his statement, puberty and the advent of menstruation are marked by seborrhœa, the appearance of acne and comedones in the face. This is so common that the inauguration of sexual life is predicted from the appearance of these symptoms; yet he is in doubt as to a direct relationship on account of the appearance of similar diseases in men, and the fact that an acne appearing in a girl at this period may continue unchanged for years. The causal relation is better marked, Behrend continues, in eruptions which appear a few days before the menstrual period, disappearing spontaneously with its cessation. This is more especially the case during the first menstrual periods: at times they return later in life with the catamenia. That the dermatoses which he has observed and believes to be dependent upon uterine changes are strictly reflex symptoms is proven by the following typical description: They begin several days before the appearance of the flow, and vanish spontaneously as it ceases or a few days thereafter, but return regularly with each period, so that the coming of the flow can always be predicted by the appearance of the eruption. This is the best evidence of a reflex neurosis, and characteristic of a causal relation, as the menstrual neurosis almost invariably bears this same temporal relation to the hemorrhagic flow.

Behrend has well described another peculiarity of these menstrual

dermatoses—their localized or isolated appearance. A single pustule develops with the coming of the menstrual congestion; a single red spot upon chin or cheek, upon the thigh or any part of the body; thus in one patient a single acne-pustule was observed which appeared at different times in different places, sometimes upon the knee, sometimes upon the elbow or chin, not the slightest evidence of a second pustule being anywhere observable. Erythema he has observed in the same way, and cites an erythema multiforme and a herpes iris continuing for a period of eight or ten days during the catamenia. Lailier, Steller, and Schramm describe such cases. Herpes and ecchymoses are related by Bartholemius and Steller; hemorrhagic nodules by Wilhelm; diffuse inflammatory dermatoses of an erysipelatous character by Behier, Greletti, Wagner, and Pauli. These inflammations are occasionally accompanied by œdema and followed by desquamation. In France this is known as the *érysipèle cataménal*, and was formerly confounded with true erysipelas. Behrend tells us that these dermatoses are occasionally concomitants of menstrual disorders, displacements, or catarrhal conditions, but frequently without marked disease (undoubtedly an erroneous statement, the result of imperfect examination). At times the causative connection is distinguished, as in the case cited by Schramm: A lady 36 years of age, formerly regular, became the subject of a uterine catarrh in consequence of a cold; this was followed by a cutaneous eruption, which, notwithstanding its repeated recurrence, steadily diminished with the improvement of the uterine disease in consequence of local treatment. In all cases observed by Behrend the recurrence of the menstrual dermatoses was temporarily checked during pregnancy. Collard relates the case of a young Norwegian in whom the first appearance of menstruation was accompanied by red spots, probably petechiæ, over the entire body; the administration of sudorifics was followed by hemorrhagic perspiration, and these symptoms recurred regularly for several months with each period. Conception taking place immediately after marriage, menstruation ceased, and with it the cutaneous symptoms, which have never returned. In other cases which have been observed the eruption returned after confinement. He seeks the cause in certain unknown constitutional changes which take place in the system during the menstrual period or during pregnancy. While this may be true of the dermatoses of pregnancy, even of menstruation, of puberty, and the menopause, it is certainly not true of those accompanying a slight uterine or ovarian disease; and I must consider them as true reflex nervous symptoms directly dependent upon the morbid or physiological changes in the reproductive organs, but determined by nerve-influence and not by constitutional changes.

Striking cases have of late been recorded in medical literature,

among them the erythema uterinum cited by Kidd;<sup>1</sup> menstrual erythema by Pauley<sup>2</sup> and by Joseph Beziehung.<sup>3</sup>

Among the most common of the dermatoses I may cite the æne of puberty, flushes, sweats, and seborrhœa, which give truth to the statement of Tilt that the skin is the safety-valve of the system. The eczematous eruption of the auricle and directly behind the ear I have observed twice at this period as menstrual neuroses. I have seen the appearance of a single red spot or a single pustule, a herpes—the latter especially on the lip and on the vulva—coming, like all menstrual neuroses, two or three days before the appearance of the flow, to pass away with its cessation. The more common pathological neuroses are the erysipelatous inflammation of the face, petechiæ, pigmentation and nodules over the skin, discolorations, and a sallow complexion. The pigmentation of pregnancy is so common, and its cause so well recognized, that it need hardly be mentioned. Generally known and recognized as dependent in some way upon genital changes in women are the æne of puberty, the pigmentation of pregnancy and disease, the sallow complexion of uterine and ovarian disease: less generally known is the herpes upon lip or vulva, which is a marked indication of genital disorders. Pigmentation, so uniformly looked for in pregnancy that it is one of the most certain signs, is likewise a frequent accompaniment of uterine and ovarian disease, and yet I will by no means insist that it is always a direct reflex neurosis, as no one symptom is more liable to appear in response to the changed condition of the nervous and circulatory systems, and pigmentation is dependent upon both, and may result as well directly from morbid states of these important systems; but dominating all blood-distribution and all secretions is nerve-power (Barnes), and the irritation of the important nerve-centres arising from morbid stimulus of uterine fibres may determine such results as well. As authorities have been rather inclined to associate secondary conditions with the more directly related and easily explained causative states, so pigmentation, which is so readily determined by conditions of the blood, is referred by most investigators to this cause.

That the pigmentation which accompanies physiological and pathological changes in the uterus is caused by perverted nerve-action is evident by the peculiarity of this pigmentation, almost invariably symmetrical as it is, so well characterized by the butterfly of pregnancy or disease. So it is argued by Barnes, who cites the case related by Dr. Godson in the *London Obstetrical Transactions* of a girl eighteen years

<sup>1</sup> *Proceedings Dublin Obstetrical Society*, April, 1880.

<sup>2</sup> *Berliner klin. Wochenschrift*, 1880, No. 45.

<sup>3</sup> "Der Dermatosen zu den Genital Erkrankungen des Weibes," *Berliner klin. Wochenschrift*, 1881, No. 37.



of age sent to St. Bartholomew's Hospital for chorea in the seventh month of pregnancy: the girl exhibited a characteristic dark pigmentation of the areolæ of both breasts, leaving the areolæ for about one-third perfectly free from discoloration. This area was almost exactly symmetrical in the two sides; it was sharply limited, and, as Barnes justly says, it is inconceivable that any difference in the quality of the blood going to the part could exist. Such cases are not uncommon, but they have escaped observation, as parts of the body are often implicated which are concealed by the clothing or bedding, and, as neither pain nor pruritus is caused, the patient herself does not call the attention of the physician to her condition; the pigmentation of the face is better known, as this must be noticed by the most superficial observer, and vanity forces the patient to seek relief.

It is upon the larger surfaces of the body that the striking characteristics of this genito-reflex neurosis are most fully developed; the most peculiar configurations are traced, with perfect symmetry, precisely alike on both sides. It is needless to describe cases, as no two are alike, yet all coincide in their origin and symmetrical appearance as a rule; thus, the case of a patient recently seen in whom pigmentation of the forearm began during pregnancy, and was developed and intensified by a cellulitis during the puerperium: when I saw her, during convalescence, the discoloration had already greatly diminished, but the peculiar configuration was still perfect, alike in every detail, every dot, and every ramification on both sides. In this case the course of the ulnar nerve and its radiations had evidently been followed: darkest toward the elbow, the density diminished and the pigmentation terminated in numerous branches upon the ulnar side of the back of the hand, extending around toward the palm and the flexor front of the arm near the wrist, here and there a perfectly white spot in the dark mass, on one side precisely as it was on the other; then toward the border isolated blotches of pigment.

The only possible conclusion is that this partial pigmentation and peculiar distribution were determined by nerve-influence: hence the determining cause of pigmentary deposit must, in some cases at least, be a peculiar condition of the nerves at their ultimate peripheral distribution. Morbid nerve-impulse from uterine terminals may determine such pigmentation; it is unnecessary and far-fetched to refer this phenomenon to changes in the suprarenal capsules produced by the changes of pregnancy.

Blepharo-melasma is seen in women with sclerosis of melancholia, but the pigmentation of the eyelids must be distinguished from the simple venous lividity so marked during menstruation. Among the peculiar cases cited by Barnes is one of blue discoloration in a pregnant woman, and in evidence of the striking nerve-influence the complete

blackening of the skin of a woman condemned to death by a Parisian mob and threatened with execution during menstruation : fright caused a sudden cessation of the menstrual flow ; her execution being deferred for a few days, her skin became as black as that of a moderately dark negro, the joints of the fingers blacker than the other parts ; she became anæmic, and died at the age of seventy-five, more than thirty-five years after the shock, the skin remaining dark until death. This was an unusually potent mental reflex, but no less intense may be the pigmentation which appears as a genital reflex : as a rule, the neurosis, like the cause, is insidious in its development and not as violent in character.

I shall cite only such cases as have occurred in my practice, and which have been proven to be neuroses by their direct dependence upon uterine and ovarian conditions.

CASE XLIX.—*Sallow, Livid Complexion ; Endometritis Fungosa ; Profuse Menorrhagia ; Operation ; Cure.*—Mrs. H——, 40 years of age, suffered from profuse menstruation, menorrhagia almost to exsanguination, the result of a small submucous fibroid and an hypertrophy of the endometrium, laceration of the cervix, enlargement and descensus of the uterus. Her complexion was so striking, leather-like, sallow, that I had often observed her on the street when passing in her carriage before she came under my care. Energetic treatment with local applications or perchloride of iron bettered the condition, but failed to check the profuse flow, merely lessening it ; though she lost much less blood, her complexion remained the same. Operation was then determined upon ; the uterus everted, the laceration repaired ; within two days after the operation her complexion began to clear, and before she left her bed, less than ten days later, before she had gained strength, still weakened by the operation, Mrs. H—— presented a completely changed appearance ; a youthful, healthy complexion, as I said to her at the time, of “milk and roses”—a complexion to be envied by a young girl in the best of health.

The above case is a striking evidence of the dependence of this livid complexion upon nerve-influence, and not upon nutrition or the blood-state ; and, in fact, I have now so often observed this that I assure a patient, afflicted with such uterine disease as is susceptible of decided improvement, of a youthful appearance : especially after operation for laceration of the cervix have I seen this change, rarely as sudden as in the case above described, but always sufficiently rapid to determine the question of its origin, a healthy complexion appearing long before an improvement in nutrition and a gain in weight.

CASE L. *Genito-reflex Abdominal Melasma ; Retroversion, Metritis, Endometritis, with Erosion ; Local Treatment ; Cure.*—Mrs. X——, from the interior of Missouri, had been under treatment for the

uterine disease which had impaired her general health; but no improvement being visible, the attending physician had placed a Hodge pessary, which had cut into the cervical tissue and caused additional pain, confining patient completely to her bed. When this lady came under my care she was in a wretched condition, emaciated, debilitated, with beginning bed-sores, and I found, in addition to the ugly cervical erosion, a deep semilunar line which marked the position of the pessary: this, like the granulating cervical erosion, suppurated freely. The abdomen was absolutely black, a lighter ring about the navel, with a fading margin toward the spine of the ilium. I was told that this condition, which had caused much fright, as it was supposed the patient was mortifying, had appeared since the aggravation of her condition by the placing of the pessary. The local condition yielded rapidly to antiseptic washes, iodoform, and carbolated tampons, together with mild applications to the endometrium, and after the third or fourth application the abdomen began to pale, and when the patient returned to her home, after the second week of treatment, the surface was mottled, quite pale in places, with darker grayish-brown spots. Although her general condition had improved very much during her short stay, this perfectly black pigmentation could never have disappeared with the comparatively slight constitutional change had it not been under direct nerve-control, dependent upon the post-cervical ulceration with which it had made its appearance, and with the cure of which it vanished before any very decided constitutional change had taken place. This is one of the most striking cases of pigmentation which I have seen; the milder forms are common.

CASE LI. *Genito-reflex Facial Dermatitis; Acne Rosacea; Laceration of the Cervix, Metritis, Perimetritis, Anteversion, and Descensus Uteri*.—Mrs. E——, aged 36 years, mother of five children, whom I attended in her sixth confinement, had suffered from an annoying eruption of the face which covered the nose and in part the cheeks in butterfly form: she had not been benefited by treatment either by dermatologists or general practitioners: gynecological applications had been made, I was told, but most probably in a very superficial manner, as no local or general improvement followed the uterine treatment. The slight treatment which was permitted after the confinement while I attended the patient was followed by a very marked improvement in the cutaneous disease, but, her general condition being fair, she ceased treatment as soon as she was free from suffering, before the long-existing chronic uterine disease had been relieved; hence the dermatosis was only relieved, not cured.

CASE LII. *Erythematous Eruption of the Face, with Menstrual Exacerbation; Retroversion, with Metritis and Endometritis*.—This long-existing and annoying dermatitis disappeared almost completely, with-

out direct interference of any kind, upon treatment directed solely toward the uterine disease; a relapse following injudicious exertion during my absence in the summer, the erythema partially returned, but yielded again, so as to be scarcely noticeable, upon the placing of a proper pessary.

CASE LIII. *Reflex Erysipelatous Inflammation of the Face improved by Gynecological Treatment; Cured by Reposition of the Uterus.*—Mrs. X—, suffering from pelvic pain, nervous and physical prostration due to hyperplasia, endometritis, and ante flexion of the enlarged uterus, was afflicted with an erysipelatous inflammation of the face which had persisted during the last two and a half years, the cutis being always in an irritated condition, showing a decidedly erysipelatous condition during the menstrual congestion. A specialist had never been consulted; no well-defined treatment had been attempted, but various popular remedies and mild applications occasionally recommended by the family attendant had been tried, always in vain. With improvement in the uterine state by treatment of the endometritis the severity of the menstrual attacks diminished, and by continuous treatment with tonic medication, but without any cutaneous applications, the dermatosis gradually faded, but a trifling evidence of the previous state appeared with the coming of the menstrual congestion. With the placing of a pessary, by which the uterine displacement was overcome, after cure of the inflammation all traces of the reflex at once disappeared, and during the last five or six years, though the patient has not consulted me, I have heard of no return, and have seen no evidence of the trouble in occasionally passing her on the street.

Bleeding from navel, from eyelids, nose, and ears at the menstrual period I have recorded among the neuroses of the circulatory system.

CASE LIV. *Acne Pustule on the Side of the Nose, recurring with each Menstrual Period; Ante flexion, Endometritis, and Perimetritis.*—Miss C—, from Texas, 26 years of age, long afflicted with vesical pains, the result of pressure of the ante flexed uterus, menstrual suffering, and great nervous depression, was much annoyed by an acne pustule which appeared for three successive menstrual periods upon one and the same place, on the right side of the nose, but ceased to come with decided improvement in both the position of the organ and the catarrhal inflammation.

CASE LV. *Vesicular (Herpetic) Eruption on the Labia; Retroversion, Descensus Uteri, Endometritis, Metritis; Cure with Reposition of the Uterus and Relief of the Inflammatory Symptoms.*—Mrs. E—, mother of several children, suffered from a number of reflex nervous symptoms—loss of vision, amblyopia, cloud before the eyes, abdominal distension, and the appearance of several herpetic vesicles upon the labia—during the menstrual period; this eruption had accompanied



the catamenia since the exacerbation of her symptoms, but ceased to make its appearance after two months of successful treatment.

It is hardly necessary to enter into the details of these cases, as it is impossible to rehearse all the numerous forms of dermatoses, as every one of them may, I believe, appear as a genito-reflex neurosis, and not in response to any one definite uterine lesion, attacking such part as is predisposed and determined in character by the condition of the system or of the tissues at the time. The red spot which has always appeared on the chin, the vesicle which has appeared upon the lip during the menstrual period, I have observed, but not for a sufficient length of time to determine the effect of uterine treatment upon the cutaneous affection. The pruritus which I have observed in two cases coming shortly after the menopause, and most inaccessible to treatment, I believe to have been a neurosis on account of its extremely persistent character: having resisted dermatological treatment for many years, it was mitigated and greatly improved by local applications combined with careful treatment of the uterine disease, which existed in both cases: a complete cure was finally effected in the one case only by galvanism, but the neurotic character of the disease was well marked by the success of the single application by which the disease which had so long resisted treatment was suddenly cured; though it again returned some weeks later in a mild form, its violence was broken. In the male, preputial herpes has been observed in distinct dependence upon ulceration of the penis.

Among the hysterical cases is that of Le Cat (Barnes), who observed a patient whose left leg became black during each pregnancy. The menstrual erythema of the thighs around the vulva I have seen as a concomitant of uterine disease, but cannot positively assert its direct reflex relation.

The formation of small tumefactions I have observed but twice: in one instance as an occasional occurrence in an extremely neurotic patient, a great sufferer from dysmenorrhœal pains; but as uterine treatment was out of the question, I was obliged to resort to the bromides, without effect, but found the action of a mild faradic current most successful in relieving the blinding headaches and overcoming the intense pains which followed the course of certain nerves; when in the arm the appearance in this extremely emaciated patient, in whom every fibre could be observed, was that of a whipcord stretched from the lower portion of the humerus to the upper portion of the forearm, over which the skin hung, the arm being slightly bent; and upon various parts of the body small tumefactions of the size of half a walnut appeared, to pass away with the cessation of the menstrual flow as rapidly as they had come. I can only regard their appearance with the coincidence of menstruation and exacerbation of the uterine dis-

case at times of great bodily suffering and nervous excitement as indicative of their reflex nature. In the other case, which I would cite more fully, the reflex nature of the phenomenon is clearly depicted. The influence of a morbid nerve-impulse upon the development of cutaneous eruptions is apparent in some of the most common of these diseases, as the herpes zoster, which is confined to the area of a certain intercostal nerve, and the pruritus vulvæ, which has been known to return and persist even after the affected part of the skin had been completely excised (Schroeder); and, on the other hand, I have seen a most unyielding case cease upon a single application of galvanism. Herpes preputialis in the male may appear in response to urethral irritation, as in the case of emotional icterus cited under the hepatic reflexes, in which the lichen, like the jaundice, appeared either as a cerebral reflex in response to a sudden moral emotion, great fear, or to the balanoposthitis and ulceration of the penis, with the cure of which it disappeared.

CASE LVI. *Genito-reflex Tumefactions of the Cutis and Subcutaneous Tissue; Menstrual Hystero-neurosis of Various Organs.*—Miss E. H—, under treatment for chronic uterine and ovarian inflammation, metritis, endometritis, antelexion, complained less of direct pains than of the numerous reflex symptoms depending upon the pelvic disease. When the patient first came under treatment the most striking of the reflexes appeared at the time of the menstrual congestion: pains in the top of the head, in the back of the neck, with distension of the stomach, were constant; the menstrual neuroses were intense in character; the breasts became tense and painful; small tumors appeared, especially upon forehead, breast, and back; the pain in the top of the head was intense. Invariably with the nausea comes a tingling in the fingers, but she can never vomit. Nausea and tingling in the fingers always coexist. All these symptoms appear now simultaneously with the coming of the menstrual congestion: the majority have existed since the development of a catarrhal condition in the utero-vaginal tract, the result of a severe cold taken in a winter's frolic some five years ago; both local pains and reflex phenomena were mild in character, but with the aggravation of the uterine disease, brought about two years ago by the patient's slipping and falling heavily upon the ground, evidently determining or aggravating the antelexion, the tingling in the fingers and body grew worse, and the pain in the head, which did not exist before, came on. The case is a typical one. We see a group of symptoms mild in character, appearing as functional reflexes in response to uterine and ovarian irritation, suddenly very much aggravated by the development of a new uterine status, an increase and exacerbation of the old condition. The gastric neurosis, which before this accident existed as a mere gaseous distension, developed into intense

nausea; the tingling in the fingers and other parts of the body grew worse; and the pain in the head came on as an entirely new feature in the case: all yielded to uterine treatment.

Not in certain of these dermatoses only, but in almost all, is it difficult to determine their proper status, unless by its vacillation with the improvement and exacerbation of uterine disease, independent of the condition of the system, and by the effect of gynecic therapy: even menstrual exacerbation may take place in a dermatosis not reflex in character, but secondary to, or a mere concomitant of, the uterine disease. The failure of proper dermatological treatment may lead us to suspect a reflex, and this will be proven by the disappearance of the eruption upon gynecological treatment alone.

Like other genito-reflex neuroses, the dermatoses are improved by, and may yield temporarily to, sedative medication, especially the sedative action of galvanism. It is difficult to differentiate as to the correct causative dependence of these phenomena, whether reflex or symptomatic, whether secondary or vicarious; whether incidental coincidences or resultants of the same condition, to which must be ascribed the pelvic symptoms, we are not yet in a position to determine without the aid of the unfailing test, treatment.

### VIII. MAMMARY HYSTERO-NEUROSES; REFLEX SYMPTOMS ON THE PART OF THE BREAST.

The precise position which mammary changes assume in relation to the reproductive organs is difficult to determine, on account of the close connection existing between these parts, which we might term internal and external sexual organs; and it is for this reason only that I here treat of the mammary hystero-neuroses in a separate section, distinct from the glandular reflexes, the breast being a gland so different from all others by reason of its intimate connection with the sexual organs; in fact, it is usually considered as a member of that group, and must justly be classed so, as we see all physiological phases of sexual life represented in the mammary glands, precisely as they are in uterus and ovaries—the development at the time of puberty, even the menstrual congestion, and, the period of sexual life being closed, the shrivelling of the breasts. A separate functional activity, however, is established during the puerperium, whilst the development of the mammary gland accompanies that of the uterus: its highest functional activity is in process when involution takes place in the pelvic viscera. Hence we see a distinct purpose served and the functions of the mammary gland independent in time and purpose of those in the pelvic viscera. All physiological changes in the pelvic organs have an exponent in well-characterized changes in the mammæ, and even physiological changes

are there depicted. The enlargement of the breast which accompanies puberty and pregnancy, the retrograde metamorphosis during the menopause, are not resultants of uterine and ovarian changes, but concomitants dependent upon the same general fluctuation of sexual life. The same mammary symptoms may appear in very different relation to the pelvic status as a resultant of the same cause, as a concomitant or indirect response. The congestion of the gland which accompanies conception or menstruation is by no means an evidence of dependence upon the uterine condition, a reflex response to pelvic stimulus; and yet such reflex occurs frequently as a swelling. Pathological changes in the pelvic organs are more likely to determine reflex symptoms in the mammary gland, the concomitant changes more commonly accompanying physiological conditions. The most frequent of the mammary reflexes are a swelling of breast or nipple, or both, and a pain more or less deep-seated—a mastodynia. These may appear as constant or pathological neuroses, with menstrual exacerbation, or merely in response to the monthly intensification of uterine disease.

CASE LVII. *Menstrual Hystero-neurosis of the Breast; Peripheral Cardiac Neurosis; Laceration of the Cervix, Endometritis, Retroversion, Descensus Uteri; Operation; Cure.*—Mrs. McC——, 32 years of age, of good constitution, had been in excellent health before her marriage, but began to fail slowly after the birth of her first and only child. Nervous symptoms slowly developed; great prostration, nervous and physical, resulted from the profuse menorrhagia and the painful central symptoms. Hemorrhage was checked by curetting of the uterus, and the patient appeared to gain strength, but the reflex symptoms in nowise abated. Great nervous prostration existed and she suffered intensely from mental anxiety, a sudden feeling of something terrible about to happen; she could not lie still in one room; jumping up to seek a safe place in another, her fears drove her from place to place. At times she had “spells,” as she called them, as if she must die; palpitations of the heart, with a thumping that appeared audible, caused great anxiety. She had a feeling as if her breath was being drawn from her; insomnia, with symptoms all aggravated with the coming of the menstrual congestion; and with this exacerbation came a swelling with pain in the left breast, the left side of the pelvis being the most affected. Left laceration with slight perimetritis. April 26th, treatment was inaugurated—local applications of mild astringents to the cavity, galvanism, reposition, and support of the uterus with elastic tampons repeated on alternate days. After the third treatment the severity of the symptoms abated. The menstrual period coming on after the fourth or fifth treatment was accompanied by much less suffering. She was enabled to rest with comfort at night and to lie quietly in the daytime, her fears no longer haunting her; the mastodynia was slightly diminished. The



patient improved in appearance and in spirits, and her complexion cleared, and after nine more treatments in the next intramenstrual period, the flow came on without the swelling and pain in the breast which for the past year had invariably preceded it, and which had come with such regularity and severity that the patient looked upon them as indications that the period was at hand.

In this case the reflex nature of the symptom was clearly proved; its appearance with anteflexion and development with uterine symptoms, and its cessation with improvement in the pelvic condition even before a cure was effected, characterized it as a genito-reflex neurosis.

CASE LVIII. *Constant Hystero-neurosis of the Breast.*—Mrs. S—, aged 30, hysterical, nervous, married nine years; sterile; has acute anteflexion, endocervicitis, oöphoritis, and hydrosalpinx. While the fluid in the cyst is accumulating the patient is confined to her bed with neuralgic headaches and intense hypogastric pains; at such times the breasts become tense and exceedingly sensitive, with a dull, heavy, rarely a lancinating, pain, which penetrates to the shoulder-blade. This period of accumulation and suffering, direct and reflex, is followed by a copious watery discharge per vaginam, and relief from the pain. The breasts then become less tense and painful; the menses are comparatively regular, and have no causal connection with the mammary enlargement and suffering, which in this case is dependent upon and indicative of the intensity of the pelvic suffering.

CASE LIX. *Menstrual Hystero-neurosis of the Breast.*—Mrs. M—, aged 33, married at nineteen, sterile; anteflexion, painful dysmenorrhœa; the appearance of the menses is preceded by shooting pain in the breasts, most severe when the general suffering is increased, and always easier when the flow comes or ceasing altogether with the disappearance of the discharge.

After operation for the flexion these severe premenstrual mammary pains disappeared, but instead a soreness of the nipple and swelling of the breasts showed themselves in the week preceding the flow, which completely passed away with the relief of the hyperplasia by treatment after cure of the stenosis.

CASE LX. *Lateroflexion with Slight Anteflexion; Dysmenorrhœa.*—Mrs. S—, aged 22, married at nineteen; sterile. Two or three days before the time of the monthly change lancinating pains began to appear in the breasts, which became tender to the touch, but did not increase in size; this condition continued throughout the period, and disappeared with the cessation of the flow.

The development of the mammary gland accompanying that of the pelvic organs at puberty is often associated with an unnecessary turgescence and pain, which is most probably a reflex neurosis and not a necessary concomitant of the physiological condition. The gland may

be the seat of intense pain without swelling; the nipple alone may be swollen and sensitive, or the entire gland tense and painful to the touch. This is the more frequent of the hystero-neuroses, usually appearing two or three days before the flow, and passing away with its cessation, rarely a few days later; sometimes with the coming of the free discharge when the catamenia are well established.

### IX. THE GLANDULAR NEUROSES.

The dependence of glandular changes upon the varying conditions of the female sexual organs has never been brought to the attention of the profession in its full extent, notwithstanding the close relationship which is known to exist between certain glands and the reproductive organs. Popular belief in olden times pointed to the thickened neck as an evidence of consummated marriage or of pregnancy: this was the reflex congestion of the thyroid. Ovariologists know that inflammation of the parotid is liable to accompany ovarian sepsis or inflammation of the pelvic peritoneum, and in the male the response of parotid disease to affections of the testicle is known to every practitioner, as well as a relation of somewhat different character, the metastasis, as it is called, of the mumps to the testicle.

Perspiration, hypersecretion of the sudoriparous glands, and increased salivation, which I believe to be glandular reflexes, were looked upon as a sign of pregnancy by the fathers of medicine.

The glandular changes which accompany physiological and pathological fluctuations in the reproductive organs are by far more numerous than is generally supposed. I have enumerated above the best known of these peculiar phenomena, but even the important glandular organs seem to respond occasionally to a perverted or morbid impulse from the genital fibres. The liver especially seems at times to answer the ganglionic impulse, as do the less important cutaneous and subcutaneous glands and the small glands of the stomach and intestines. I do not wish to be misunderstood and to appear as saying that the glandular changes which accompany the development of menstruation or pregnancy are of necessity reflex neuroses. Changes in the entire system which are the natural resultants of the potent stimulus which accompanies the physiological changes in the reproductive organs—hypertrophy of the heart, increase in the quantity and quality of the blood, increased pressure to force the nutrient fluid through the developing tissue and the new-formed channels—must naturally determine a hyperactivity in the parts, and thus bring about changes of various kinds; and between the precise nature of these, whether resultant, concomitant, or reflex, we are not yet in a position to differentiate fully. The functions of the cutaneous glands are supplementary to those of the lungs

and kidneys; in fact, not only is increased labor demanded from all, but in individual cases, under peculiar circumstances, infirmity of one may necessitate increased action in another; the refuse material must be cast off, whatever the path may be. Thus, even the kidneys are influenced, and we well know the peculiar dependence of renal action upon the emotions, and that the anastomosing ganglionic fibres connect with the uterus as well as with the brain and spinal cord: whilst the profuse, pale urine indicates a hypersecretion in response to cerebral stimulus, the frequent and painful micturition may be the result of morbid molecular action imparted from the uterine centre: painful or frequent micturition which accompanies the menstrual period or uterine disease is not of necessity caused by pressure of the temporarily enlarged uterus, but may, I believe, be an evidence of nerve-irritation, a reflex symptom.

*Thyroid Enlargement.*—This symptom, taken as an evidence of physiological activity of the reproductive organs by the poets and physicians, as well as the common people of Rome, was even regarded by so acute an observer as Meckel (Barnes) as a repetition of the uterus in the neck. This I have repeatedly observed as an accompaniment—I cannot say positively a reflex—of uterine disease; thus this enlargement existed, together with a pharyngeal neurosis, in a young girl suffering from painful menstruation, and, after resisting local treatment, yielded slowly, long after the disappearance of the accompanying reflex, with general improvement and a cessation of the menstrual pain.

As a proof of the peculiar influence of the nervous system upon this gland I may cite the coexistence of goitre, idioey, and deformity in the cretins of the Alpine valleys.

CASE LXI. *Genito-reflex Thyroid Enlargement.*—Mrs. H—— was annoyed by this very observable thickening of the neck, which appeared to decrease a little upon the application of galvanism after having resisted the iodine treatment, and lessened decidedly with improvement of the uterine disease. Whether it first appeared in response to this or as an accompaniment of pregnancy I cannot say, as its development was coincident with both.

*Salivary Glands; Salivation; Induration and Impeded Action.*—A hypersecretion in both glands may accompany menstruation or pregnancy, and when it occurs is frequently one of the first evidences of conception, so that its appearance in the second pregnancy is recognized at once by the patient as a mark of her condition, of which she has no other proof at the early day at which this reflex appears. It is the fact of this rapid development so soon after conception has taken place, long before secondary circulatory changes occur, that leads me to look upon this as a physiological reflex.

A highly-educated lady, the wife of a physician, was afflicted in her first pregnancy with this same symptom, which again appeared soon

after the second conception, and in less than twenty-four hours. The salivation had been so annoying that she well remembered it, and at once looked upon its return as an evidence of pregnancy. This was soon verified. The reflex persisted throughout the entire period: severe in the earlier months, it becomes less annoying in time, to pass away entirely with delivery.

The hardening of the salivary gland upon one side I have observed as an accompaniment of excessive hypertrophy of the uterus with cellulitic effusion, and in a young girl at puberty it existed as an accompaniment of a painful menstruation; and so certain an indication was this that a hardening more or less intense invariably served to indicate the character of the coming period.

Goodell, in his paper on "Inflammation of the Parotid Glands following Operations on the Female Genital Organs,"<sup>1</sup> mentions two patients, one with excessive salivation during menstruation, the other suffering from a congested and diseased left ovary, with a left parotid gland which did not secrete during menstruation, causing the mouth and fauces on that side to be dry and painful, as in my own cases mentioned above. Barnes looks upon salivation as simply an evidence of the general glandular activity induced by pregnancy; which, it may be conjectured, is a provision for the elimination of excess of circulating fluid and products of nutrition that have to be cast off; whilst he truly says that, as in so many other instances, physiological provisions easily pass into morbid excess, as in the patient who came into his consulting-room holding a pint mug, which was a constant companion, being filled several times a day. I can hardly agree with this statement of the able author, because we may see likewise a diminution of the secretion, as in my own cases and the one mentioned by Goodell, which serves to strengthen my belief in the reflex nature of these symptoms.

The hystero-neuroses of the salivary glands, precisely like the reflex symptoms on the part of the nerves, the skin, and other organs, may exist either as a paralysis or a hyperactivity, so well observed in the circulatory system, which gives evidence of the reflex either by the flushes, the paralysis of the vaso-motor system, or by the cold skin, the chill, the hyperactivity. The sudoriferous glands respond in the same way, either by perspiration or by a dry skin.

The metastasis of mumps to the sexual organs in both sexes is a remarkable evidence of the existing nerve-connection. In the female the breasts, the ovary, the womb, and the labia are the organs in which the sympathetic transference takes place: in the male it is the testes. During the later stages of acute specific fevers it is not uncommon to meet with parotid bubo, a septic inflammation of the parotid glands,

<sup>1</sup> *Transactions of American Gynecological Society*, vol. x. p. 211.



ending very generally in suppuration. This form of parotitis, Goodell—from whom I have quoted the preceding—tells us, is not deemed sympathetic, but symptomatic of a poison in the blood which is exploded in the parotid glands; yet he continues: “I am not sure that an element of sympathy does not exist even in this form of suppurative parotitis, and that the parotid glands are not perverted, because we have septic fever which starts from lesions of the sexual organs.”

Parotid bubo seems liable to follow ovariectomy whenever sepsis takes place. In 200 cases of ovariectomy performed by Schroeder and reported by Morike,<sup>1</sup> 5 cases of parotid bubo took place, with 2 deaths.

Goodell reports a swelling of a parotid gland on the third day after an ovariectomy, with barely a rise in the temperature, which passed off without any untoward symptoms, notwithstanding the alarm caused by the belief that the swelling was mumps and that it might do mischief by metastasis.

This inflammation of the parotid glands after ovariectomy is confirmed by observations of Dr. Matweff of St. Petersburg. Dr. Emmet, Dr. Mann, Dr. Baker, and Reamy all record similar cases.

Goodell also relates a case of puffing of first one and then the other parotid gland the second week after an operation for laceration of the cervix, which persisted for ninety-two weeks, so that the patient was unable to masticate solid food and had to be fed on fluids. I heartily indorse his belief that these are more than mere coincidences, but I would even go farther than the statement made by this able teacher, that “a kinship of sympathy exists between the parotid glands and the adult sexual apparatus,” and would say that a direct nerve-connection is established through the ganglionic fibres by which reflex activity is excited.

*The Liver.*—The direct control of hepatic changes by morbid uterine stimulus I cannot positively assert, and yet hepatic pains undoubtedly occur as neurotic responses to morbid conditions of the uterus, and hepatic congestion I have repeatedly observed in patients suffering from uterine disease, the circumstances being such that we might eliminate external influences, and I have been sorely tempted to refer the condition directly to the genitalia. We cannot assume a dependence upon similar causes, as we may in the systemic congestion of pregnancy: certain it is, whatever the cause, that in the Mississippi Valley, abounding in malarial influences, hepatic conditions will readily occur in the weakened systems of patients suffering from uterine disease.

The first case of the kind which attracted my attention was that of a patient afflicted with other neuroses (Case XV.), who suffered from a pain in the region of the liver, and was imbued with the idea that

<sup>1</sup> *Zeitschrift für Geburtshülfe und Gynecologie*, vol. viii., 1880.

she had hepatic trouble: never satisfied with the explanation given, she was perfectly content after the statement of a physician, who examined her but superficially, that she had an enlargement of the liver; which was not the case when examined by myself and others soon after: it may possibly have been a menstrual congestion. The occurrence of hepatic symptoms in patients suffering from uterine and ovarian disease is surprisingly frequent, even though we consider the influences under which we live, and that a certain percentage of hypertrophies must be expected in this malarial region. Certainly at periods when fevers are common patients under treatment for uterine disease are the most ready victims, and at such times I invariably see many cases, as a large percentage of my patients show more or less marked symptoms of malaria, usually with hepatic complications.

Barnes in the articles so frequently referred to believes that the glycosuria of pregnant women illustrates the potency of nerve-influence upon hepatic functions, and may one day be the means of solving the mystery of diabetes, and, I would add, of reflex hepatic symptoms.

Claud Bernard's experiments, the production of sugar in the liver by pricking the floor of the fourth ventricle, furnished a striking proof of the influence of nerve-force over the action of the secreting organs. Possibly, as Barnes states, the "altered quality of the blood passing through the liver is an essential condition." Whether the action is in response to uterine stimulation through direct ganglionic connection or by means of the medulla oblongata is a question: certainly, organic lesion of the nerve-structure, as Barnes correctly observes, is not necessary as a factor, as is proved by the complete disappearance of sugar after glucorrhœa during pregnancy and by the integrity of the nerves after its termination.

Every observation in regard to the hepatic reflexes is of value at this period; hence I will add a case of emotional icterus recently reported by Dr. McGrew,<sup>1</sup> to substantiate the occurrence of hepatic neuroses, be they direct nerve-reflexes or brought about through the vaso-motor system, though proved, I believe, by physiological experiment and by the genito-reflex symptom in woman: A patient who had for two years suffered from a slight urethral discharge was attacked by a severe balanoposthitis in consequence of a powerful canterization: he became greatly alarmed, fearing the sloughing off of the penis, and the emotion was followed by an intense jaundice and an eruption of lichen upon the dorsal and lateral portions of the thorax, part of the abdomen, face, and scrotum; little or no itching. Notwithstanding treatment, the jaundice and lichen at first grew worse, but began to subside in ten days, with great improvement in the ulceration. At the end of three weeks the balanoposthitis and preputial ulceration becomes entirely

<sup>1</sup> *The American Lancet*, 1886, p. 364.

well ; jaundice, hardly distinguishable, on the sclerotics ; urine normal ; lichen on face disappeared, but remained on the body for a week longer. The icterus and lichen can only be attributed, as the author states, to sudden moral emotions caused by fear, since the liver and other organs were normal ; no excess had been committed, and no chill had occurred.

Among the glands affected by pregnancy Barnes mentions enlargement of the spleen.

Peculiar are the cases of women who for several years had been wholly cured of ague, and who suffered a relapse when pregnancy overtook them, and that not once only, but in successive pregnancies : when they were not pregnant not a single attack occurred. Barnes records similar cases, and asks, "Is this recurrence due to a suddenly induced enlargement of the spleen by the blood-degradation attending pregnancy, to the exaltation of neurotic irritability, or to a combination of all three conditions, or to some other which has escaped attention?" An exalted centric nerve-irritability certainly exists, but the blood-degradation I should hardly consider as the concomitant of healthy pregnancy ; heightened activity of course determines a greater amount of refuse to be carried away.

*The Kidneys.*—Unfortunately, I have not observed with sufficient care those cases of renal and cystic irritability, of frequent and painful micturition, or variations in the secretion of urine, to determine their true nature, whether secondary, sympathetic, symptomatic, or reflex. I have been satisfied to see such cases improve, and disappear with improvement in the uterine disease. But as to the true causative relation I can make no assertion. I have not ventured to suspect their reflex nature, and, occupied of late with questions of greater interest to me, I have allowed such cases as might perhaps have led to a solution to pass from observation, satisfied with the result without sufficiently careful inquiry into the possible cause.

Hypersecretion, hyperactivity of bowel and kidney, are known to result from increased nerve-stimulations : even in animals these functions respond to the emotions. Diarrhœa I have repeatedly seen as an unquestioned reflex symptom—a menstrual hystero-neurosis yielding to treatment of the uterine disease unaffected by local medication even when violent in character, the patient, for instance, being obliged to get up six or eight times during the night : a menstrual diarrhœa which had continued for several years unabated, unaffected by remedies which had been tried, yielded to an improvement in the uterine condition after six weeks' treatment. Frequent micturition as the result of mental excitement, especially if emotional in character, is a most common occurrence ; the copious clear urine is an almost invariable response to nervous excitement, occurring so frequently that it may be taken as an evidence of such state. More doubtful is the albuminuria of pregnancy

without structural changes, which I believe at times to be the result of nerve-stimulus arising in the uterine terminals—a reflex neurosis. This is one of the various forms of albuminuria gravidarum, and I believe equally dangerous to the patient as a cause of puerperal convulsions; and I doubt that albuminuria determined by any other cause could result in symptoms so sudden and so violent: the loading of the urine with albumen, dangerous convulsions, all of which suddenly cease with removal of the cause, with the expulsion of the foetus, the emptying of the uterus. Unfortunately, I cannot adduce evidence as satisfactory as I should like to bring forward as proof of the reflex nature of cystic and renal phenomena. The theory has been sufficiently discussed, and upon this I will not enter, as facts sufficiently positive I cannot add.

The hysterical bladder by which vesical catarrh, and even stone, are simulated is one of the symptoms of that still mystic disease, hysteria, probably a response to spinal or cerebral irritation; but as we know that the innumerable fibrils which carry the uterine stimulus not only to all the great centres, but also to the most distant terminals, extend to the bladder as well, as they do to other organs, we may expect to find these neuroses in response to irritation from uterine ganglia as readily as from the spinal centres.

### RÉSUMÉ.

I trust that I may have succeeded in directing attention to the frequency and importance of the hystero-neuroses, those reflex symptoms on the part of the different organs which so closely resemble disease in the cutis and in the glands, even approximating it in all particulars, with accompanying structural changes. The reflex nature of these phantoms of disease has been appreciated by the popular mind in olden times, as it is to some extent at the present day: certain of these phenomena are so common that they have been accepted as signs of pregnancy, and, notwithstanding the intuitive understanding of their nature by the ignorant, the medical profession apparently persists in ignoring their true nature. There is no more striking evidence of this unfortunate fact than the unswerving course of the practitioner in the treatment of the nausea and vomiting of pregnancy. This well-known reflex symptom, which yields promptly in most instances to uterine treatment, like other reflexes is indifferent to direct medication. Of late years these most interesting, most peculiar, and by their frequency and violence important symptoms have been studied by various specialists, and yet the intricate coil has not been fully unravelled, because the study at all times has been from one side only. The gynecologist alone cannot solve the secret of the reflex dermatoses: whilst by his treatment of the uterine disease he cures the cutaneous eruption, his



ignorance of all special study of dermatology does not enable him to fully utilize the advantages offered him for observation. The dermatologist, on the other hand, recognizing a kinship between certain eruptions and the functional changes and diseases of the reproductive organs of women, is not able to assure himself positively of its nature: he recognizes only a cutaneous disease which is peculiarly unyielding to treatment. Whilst the existence of reflex symptoms on the part of various organs and the known dependence especially of mental and nervous phenomena upon uterine changes, so evident more particularly during puberty, menstruation, and the menopause, have excited the interest of individual observers, the reflex has rarely been clearly distinguished from the secondary or concomitant phenomenon, and the practical bearing of the question has not been revealed; hence it has been avoided by teacher and textbook, and this eminently practical and important field still remains a waste. The specialist alone seems to have observed these phenomena, and has looked upon them more as oddities, and not as fit subjects for scientific investigation and medical teaching: textbooks and teachers tell the student practically nothing of this grand group of symptoms, and yet it is an element in his education as important almost as auscultation and percussion. Let me recall only a few of the cases I have mentioned in this paper: A gastro-nenrosis, treated as a disease of the stomach for years, leads to a gradual decline, the stomach irritated by constant medication, the system deprived of proper nutrition, and the unrecognized uterine disease insidiously progressing until it has become unmanageable when finally discovered: the health of this lady has been destroyed, after years of most unnecessary suffering, because the reflex nature of the gastric symptoms was unknown to any of the physicians who had been in attendance; a bronchial reflex culminating in the most violent asthmatic symptoms, so that the patient spends night after night in the greatest agony, never able to lie down, is treated as a true bronchial affection for years, until the constitution is broken and the pelvic disease has progressed so that treatment alone was no longer sufficient; although the reflex even then, after persisting for years, yielded to the reposition of the retroflexed uterus within a few minutes, all her organs, above all her nervous system, had suffered so that she did not survive the necessary operation: if taken in time, proper uterine treatment, mild in character, would have stayed at once the development of all of the morbid processes; but this patient likewise fell a victim to the treatment of the most apparent symptom, the reflex, instead of the causative uterine disease, which was completely ignored; or I may instance the case of the lady treated for her gastric and muscular rheumatism, which of course did not yield, who was then sent abroad, and there directed to mineral springs for what was termed a nervous debility, and urged

to exercise, sent upon long walks, which of course aggravated the uterine disease, which had so far been completely ignored; as a consequence, all treatment has been in vain; and how easily would proper local treatment have restored her to health!

Such of these reflex phenomena as are dependent upon disease and changes in the female reproductive organs I have endeavored to picture in my study of the hysteroneuroses ten years ago. Since then the subject has been elaborated, and especially the reflex phenomena which appear with the semblance of disease in the lungs, bronchi, and eye, and the reflex dermatoses have been elaborated; and all who have studied the reflexes, in whatever organ they may occur, coincide fully with me in the stress laid upon treatment of the causative disease, and the utter inefficiency of all attempts to allay the symptoms by direct medication, by such treatment as is indicated by the disease proper of which the phantom only is before us. I have here sought to describe the hysteroneuroses, the reflex symptoms depending upon changes in the sexual organs of women, and I have accepted as such none of the various symptoms of hysteria, but only such as have been proved to be directly dependent upon the genital lesion.

An examination of the cases cited will prove the fact, which may appear somewhat strange—namely, that the great mass of these symptoms seem dependent upon uterine changes, and not upon those of the ovary. Whilst in the cases I have cited the treatment has always been directed toward relief of all existing pelvic disease, the uterus has been in the main the organ affected; and in the majority of cases it was an improvement in the condition of this organ which was followed by a disappearance of the reflex symptoms. In many cases, and in the most violent, such as the terrible asthma or the tetanic convulsions, the uterine treatment was followed by a prompt response, the insertion of a stem pessary, by correcting the retroflexion, suddenly checking the terrible asthma which had persisted for years; upon the canterization of an eroded cervix the most violent epileptiform attacks vanished as if by magic. Treatment of the ovary alone I have never attempted, and a direct reference of the reflex symptom to ovarian lesions I have not been able to detect. A careful examination of the numerous cases here recorded leads me to believe that the cure of violent neurotic symptoms by oöphorectomy, by Battey's operation, is obtained indirectly by the uterine involution following, and not directly by the removal of the ovary as the offending organ. This will be readily accepted if we recall how suddenly a reflex symptom vanishes if the causative condition be reached—the displaced uterus supported, a narrowed canal dilated; after operation for laceration of the cervix, the most painful neuroses, even the discoloration of the skin, frequently pass off, if not with the placing of the suture when union has taken place, long before

constitutional improvement has taken place. Rarely has such striking relief been afforded by the removal of the ovaries by oöphorectomy, though undertaken especially for the cure of nervous diseases which seem referable to pelvic disorders and have resisted treatment. This, together with the known dependence of these reflexes upon uterine changes, leads unquestionably to the belief that a cure of nervous symptoms by this operation is impossible unless it is attained by uterine involution following the operation, and not by the operation itself.

The reflex neuroses, as we have observed, may persist after the molecular nerve-changes have continued for an undue length of time, and it is especially the eye, that most delicate organ, which is liable to a persistency of the reflex after the cure of the causative disease and to the development of the disease proper from the phantom. Likewise, we have seen that the reflexes may be relieved by the sedative action of galvanism upon the irritated uterine terminals. The action of this agent upon the exhausted nerve in the organ in which the symptom appears leads only to temporary improvement, whilst this is more certain and may prove permanent when directed to the uterine fibres or ganglia from which the morbid impulse emanates.

The variety and the importance of the reflex neuroses, whether dependent upon lesions in the sexual organs of women, upon changes in the mucous membrane of the nose, of the throat, or other parts, should secure for them a permanent chapter in the theory and practice of medicine, and the student must be taught the diagnosis and treatment of phantom disease as he is of the disease itself.

# EXTRA-UTERINE GESTATION.

By T. GAILLARD THOMAS,

NEW YORK.

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HISTORY.—In no field of medicine is the dependence of pathology upon a correct knowledge of physiology more clearly shown than in that of Ectopic Gestation. To the ancients, in their ignorance of embryology and of utero-gestation, this interesting and important occurrence must have been, and was, an enigma beyond the power of solution; and we see even so capable and so recent an accoucheur as Mauriceau refusing to admit the possibility of it.

As the process by which the ovule becomes impregnated within or near the ovary, passes downward through the Fallopian tube, and invests itself in its rapid evolution with the amnion and chorion became known to the students of more recent times, the possibility of the fixation of the impregnated ovule upon the lining membrane of the Fallopian tubes, upon the peritoneum or its contained viscera, or within the ovary itself, was gradually appreciated. This knowledge was not arrived at rapidly, but was the outcome of steady and progressive physiological research until the full understanding of to-day was reached.

Paré, Smellie, Roederer, Astruc, and other obstetricians of the olden time left on record instances of it, which they recorded, but were unable satisfactorily to explain, and Baudelocque, Capuron, Gardien, Velpeau, Denman, and others advanced beyond their level and wrote with intelligence upon it. Then came the time when, through the researches of Coste, Negrier, and Raciborsky, the true physiology of ovulation and menstruation was made clear and the process of embryology rendered comprehensible. From that time light has been freely cast upon a subject previously so mysterious and incomprehensible. It is never wise to believe that we have reached the end of knowledge upon any subject, and yet so satisfactory and so full are our data upon the physiological and pathological sides of ectopic gestation that we are almost inclined to believe that the whole truth is in our possession. This remark applies only to the physiology and pathology of the subject: as to diagnosis and treatment, we have just entered upon avenues



which, there is hope for believing, will lead us to results which will produce the greatest advantage to science and to humanity.

Should any one imagine, however, that the men of the generation just past were very far behind us in knowledge upon this subject, let him read the extremely able and interesting article of Velpeau in the *Dictionnaire de Médecine*, published in 1836, and he will be impressed with his error.

**DEFINITION AND SYNONYMS.**—The simplest and most comprehensive definition of extra-uterine pregnancy or ectopic gestation is this: the fixation and development of an impregnated ovule outside of the lining membrane of the uterus. The growing foetus may even be within the uterine cavity, as in interstitial pregnancy, and yet the gestation be ectopic; or the foetal body, entering the uterus through one of the tubes, may develop there, the placenta being attached to the tube, and yet a true case of extra-uterine pregnancy exist. An essential of normal pregnancy is the fixation of the foetal ball and the subsequent development of the placenta upon the endometrium itself. The essential for extra-uterine pregnancy concerns the location of the placenta, rather than that of the child's body; and this primary fact is closely allied to one which concerns the condition much later—namely, that in treatment the management of the placenta is in these cases of greater importance than that of the body of the child itself.

**VARIETIES.**—For the practitioner at the bedside there are three grand varieties of ectopic gestation—the tubal, the abdominal, and the interstitial. For him, depending as he does upon the use of his senses in developing clinical facts, a minute diagnosis involving the ascertaining of anything more exact than this is virtually impossible. For the physiologist and pathologist there are many more which are not only interesting in themselves in connection with embryology, but which are quite ascertainable in post-mortem investigation. The following chart presents at a glance all the varieties of the condition with which it is essential that the student should be familiar:

**TUBAL.**

*Tubal*: The foetal ball between fimbriæ and uterine surface.

*Tubo-ovarian*: Foetal ball between fimbriæ and ovary.

*Tubo-uterine*: Foetal ball in tube between mucous and serous surfaces of uterus.

*Tubo-abdominal*: Foetal ball engaged in fimbriæ and falling with tube into abdomen, and there receiving nourishment; or, the tube having ruptured, the foetus escaping into abdomen and placenta remaining in tube.

ABDOMINAL.	{	<i>Primary</i> : Ovum falling into abdomen, and there attaching itself.
	{	<i>Secondary</i> : Fœtus with placenta entering abdomen by rupture of the tube or ovary, and developing there.
INTERSTITIAL.	{	The impregnated ovum from laceration entering into uterine parenchyma and developing there.
OVARIAN.	{	The ovule, being fructified within a Graafian follicle, there developing, and the ovary growing, as with ovarian tumor.

Wonderful and eccentric are the migratory performances of which the extra-uterine impregnated ovum is capable—so wonderful, indeed, as to be almost incredible, and giving rise to exhaustive classifications.

Hubert de Louvain made twelve subdivisions, and Dezeimeris ten, of the condition. In my own experience I have found an abdominal fœtus taking its nourishment through a four-pound placenta from the entire extent of the colon from caput to sigmoid flexure; in another case, in which I removed the fœtus by elyototomy, it was developed between the layers of the broad ligament, and was outside of and beneath the peritoneum, as described by Dezeimeris and others; and in a case which I saw with Dr. Janvrin, and another with Dr. McBurney, the fœtus lay in the tube where it passed through the uterine wall (tubo-uterine), and was forced into the uterine cavity and delivered *per vias naturales*.

Instances<sup>1</sup> are recorded in which the fœtus has been found in utero and the placenta in the tube; and *vice versâ*, in which the growing fœtus was outside the mother's body in a hernial mass, and in which twin pregnancy existed, one fœtus intra- and the other extra-uterine.

The following is the classification of Dezeimeris, published just fifty years ago:

- 1st, Ovarian pregnancy;
- 2d, Subperitoneo-pelvic pregnancy;
- 3d, Tubo-ovarian pregnancy;
- 4th, Tubo-abdominal pregnancy;
- 5th, Tubal pregnancy;
- 6th, Interstitial tubo-uterine pregnancy;
- 7th, Utero-interstitial pregnancy;
- 8th, Utero-tubal pregnancy;
- 9th, Utero-tubo-abdominal pregnancy;
- 10th, Abdominal pregnancy.

<sup>1</sup> Velpeau's article in *Dict. de Méd.*, 1836.

It is an encouraging sign that fifty years of labor and of observation have diminished rather than increased the number of these subdivisions.

Mr. Lawson Tait maintains—and, it appears to me, upon very rational grounds—that it is highly probable that every extra-uterine conception takes its origin in the Fallopian tube, and that all the subdivisions and varieties noticed by authors are due to change of position of this part, adhesion of it to other organs of the body, or escape of its contents by laceration into the abdominal cavity. Upon this theory can readily be explained all the varieties mentioned by Dezeimeris, excepting only ovarian pregnancy, at best a variety of doubtful authenticity.

In concluding this part of my essay, however, I would, from my own experience with the great, sometimes insurmountable, difficulties of diagnosis attending these cases, advise the general practitioner to cling to the safe and simple classification of tubal, abdominal, and interstitial, as little likely to confuse him and as being sufficiently comprehensive for all the requirements of practice.

FREQUENCY, AND RELATIVE FREQUENCY OF THE VARIETIES, OF EXTRA-UTERINE PREGNANCY.—So many cases of this condition pass undiscovered, death from rupture of the sac being attributed to hæmatocele, peritonitis, or to some variety of abdominal tumor, that statistics upon this point are very unreliable. The only way in which we may approximate the truth is by relying upon the reports of well-regulated hospitals in which autopsies are uniformly made, and even here the question is not satisfactorily answered.

Bandl<sup>1</sup> declares that out of 60,000 gynecological and obstetrical cases received during seven years at the clinics of Carl Braun and Späth in Vienna, there were only 5 cases of extra-uterine pregnancy. Hecker, one of the most reliable authorities upon this subject, declares that of 222 cases which he analyzed, 64 were tubal, 26 interstitial, and 132 abdominal.

Parry collates 500 cases with the following results: 214 were tubal, 27 were ovarian, 29 were abdominal, and 230 were doubtful.

In my own cases I have taken the greatest care to arrive at correct conclusions upon this point, and believe that I am right in presenting my statistics thus: Out of my 33 cases, 19 were tubal, 12 were abdominal, 2 were interstitial (1 certainly and 1 probably), and none gave any reason for the supposition of the existence of the ovarian variety.

Any one who has witnessed post-mortem examinations made in these cases will appreciate the great difficulties attending the decision as to the variety of ectopic gestation which exists. The parts are matted together, put into unnatural relations, and altered by months of serious tissue-changes. During the past twenty years I have personally examined and treated 33 cases. Basing the estimate upon Bandl's statistics,

<sup>1</sup> Hart and Barbour: *Gynecology*.

these 33 cases would represent 372,000 cases seen in practice during a period of twenty years, or 18,600 cases every year. This estimate is vitiated, however, by the fact that the great majority of my cases were seen in consultation with other physicians.

No better evidence of the barrenness of our knowledge as to the frequency of ectopic gestation can be advanced than the paucity of statement concerning it on the part of authors: by many it is scarcely mentioned, and by all it is dealt with very superficially indeed.

As to the relative frequency of the different forms, information is more attainable, though even here it is of doubtful authenticity, owing to the obscurities of examinations, both ante- and post-mortem.

ETIOLOGY.—The causes of ectopic gestation may be divided into remote and immediate. I will present them first at a glance, and then before closing the subject speak of some of them specially:

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| <i>Predisposing Causes.</i> | { | <ul style="list-style-type: none"> <li>a. Prolonged nulliparity;</li> <li>b. Old attacks of pelvic peritonitis;</li> <li>c. Old attacks of salpingitis, especially if they have been specific;</li> <li>d. The existence of any uterine or tubal neoplasm;</li> <li>e. Old hæmatocele.</li> </ul> |
|-----------------------------|---|---|

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|--------------------------|---|---|
| <i>Immediate Causes.</i> | { | <ul style="list-style-type: none"> <li>a. Strictures of tube, congenital or acquired;</li> <li>b. Obstruction from mucus or pus;</li> <li>c. Obstruction from swelling of mucous membrane;</li> <li>d. Pelvic tumor pressing upon uterus or tubes;</li> <li>e. False membranes distorting or compressing tubes;</li> <li>f. Polypi in tubes;</li> <li>g. Cancer, sarcoma, or fibroma in tubes or in uterus at the horns;</li> <li>h. Previous amputation of uterine body, the ovaries being left;</li> <li>i. Rupture of uterus or tubes from traumatism;</li> <li>j. Severance of fimbrial union of ovary and tube.</li> </ul> |
|--------------------------|---|---|

Other causes have been mentioned by authors, but they are of doubtful authenticity, and I omit them; such, for example, as abuse of coitus, sudden emotional influences developed during the act, etc.

An example of abdominal pregnancy due to removal of the body of



the uterus without simultaneous removal of the ovaries is recorded by Koeberle. Conception occurred two years after the operation, a fistulous tract having of course kept up communication between the vagina and abdomen.

While agreeing in the necessity of recognizing these predisposing and immediate causes of ectopic gestation as sufficient and important factors, I cannot look back upon my list of cases without being struck by the fact that the large proportion have occurred in strong, previously healthy workingwomen who have given no reason for the fear that such a peculiar pathological condition would develop. One of my four cases delivered after full term by laparotomy was a farmer's wife; another, a fishmonger's wife living in this city, apparently a sturdy woman; and a third, a strong and healthy negress. Of course some of my patients were women of different condition, but the majority were by no means persons in whom one would have suspected the causes predisposing to ectopic gestation as here tabulated.

The only valid deduction to be drawn is this: So wonderfully and beautifully poised is the mechanism of conception and gestation that a very trivial cause will disorder it, as a grain of sand will mar the working of a telescope. No result occurs, either here or elsewhere, without a sufficient cause. I merely desire to point out the fact that previous to the occurrence of this condition no valid reasons for suspecting such pathological states as I have mentioned ordinarily existed in most of my cases.

**PATHOLOGICAL ANATOMY.**—Nothing is more delusive than the deductions based upon post-mortem examinations when practised by one unequal to the task which he undertakes. Nowhere is this more true than in ectopic gestation, where great hypergenesis of tissue, altered relation of parts, effusions the result of various inflammations, and the accumulation of the products of oft-recurring hemorrhages combine to render difficult the solution of the case for an expert, and impossible for a tyro. If the latter would acknowledge his dilemma and refuse to draw deductions, no harm would result beyond the loss of good material; but, alas! he tries too often to meet the difficulty by freely drawing upon his imagination, and the result for science is not good.

Every student is familiar with the changes which occur in the uterus when the impregnated ovum attaches itself to the endometrium. These may be summed up in a general way thus: first, rapid and immediate increase in vascular apparatus and blood-supply; second, intensification and concentration of nervous influence; and third, rapid subordination of the functions of all the organs of the body to the newly-developed state. All these changes occur in ectopic as in normal pregnancy, the only difference being that the "signs of pregnancy" are less regular

and reliable, and that the creation of the placenta being called for upon tissues not intended by nature for the vicarious work now imposed upon them, the excessive and exaggerated growth of vessels which results surpasses everything of the kind ever witnessed in the economy. He who merely reads this statement as a student may regard it as a phrase merely. He who as an operator pricks the ectopic fetal ball, even with the finest hypodermic needle, may have cause to appreciate that it conveys an important truth.

Let the student remember that with all the varieties of extra-uterine gestation which have been mentioned, there are but three tissues to which the foetal ball is ever claimed to attach itself: first, the mucous membrane of the tube, which is the source of nourishment in the tubal, interstitial, tubo-ovarian, tubo-uterine, and tubo-abdominal varieties; second, the lining membrane of the Graafian follicle, which serves for the ovarian form; and third, the peritoneum, to which is attached the foetal vessels in all the abdominal forms. Further, it is evident that in all the composite varieties there is a combination of nourishment from two forms of tissue—the mucous membrane of the tubes at their fimbriated extremity, and the serous membrane of the abdominal cavity.

Not only does development occur in these cases in and around the vicarious womb; the uterus itself enlarges, becomes softened in its tissues, and is covered by a deciduous membrane; the vagina becomes vascular, soft, violet-colored, and distensible; and the mammae become enlarged and the presence of milk shows itself in them.

Except in interstitial pregnancy there are, however, three features of uterine development in ectopic gestation which must be borne in mind as of diagnostic value: first, the cervix to the touch is less soft, less distensible, and less large; second, this part is usually found toward the front of the pelvis and high up, instead of lying in the hollow of the sacrum and low down; and third, as pregnancy advances the uterus does not enlarge proportionately.

The placenta is not symmetrical in shape, and sometimes grows to gigantic proportions. In one of my cases treated by laparotomy I removed a portion of it only, and found it to weigh four pounds; at least one pound more must have been left in the abdomen.

To illustrate the extraordinary appearance which the placenta may present under these circumstances, I mention this incident: As I was proceeding to remove it on that occasion a colleague who stood by said, "Is not that the liver at which you are pulling?" I was for a moment completely taken by surprise, and felt that awful sensation, which every operator will readily appreciate, that one feels when he finds himself upon the verge of a blunder. Passing the hand upward, I at once assured myself of the falsity of the suggestion and proceeded with the operation.

Such a case as this makes very comprehensible the singular fact illustrated by Pollak's interesting case of twin pregnancy—one child developing within and the other outside the uterus, and the latter being much the better nourished and the more vigorous of the two.

In tubal pregnancy the placenta is attached to the wall of the tube—in ovarian pregnancy, originally to the ovary; in abdominal pregnancy, to the parietal peritoneum, the intestines, the mesentery, or any of the viscera. In one case I found it growing from the bladder, and would surely have lost my patient from hemorrhage had I operated during the life of the child and the activity of the placenta. As it was, I encountered great difficulties, and left the placenta to come away by exfoliation.

As in normal pregnancy, so in ectopic: the death of the fœtus is usually at once followed by diminished placental vascularity, gradual atrophy, and final shrinkage. But as there are exceptions to the rule in the former, so are there in the latter. A striking instance of this is given by Hart and Barbour,<sup>1</sup> the title of which gives its history: "Case of Extra-uterine Gestation, with Death of the Fœtus, but continued Growth of the Placenta, which led to Fatal Hemorrhage."

Sometimes the ectopic fœtal shell will be found surrounded by layers of coagulated blood the result of repeated hemorrhages. In a case seen by me with Dr. Ferdinand Beach several distinct blood-layers could be recognized, and the difference of age between them be readily estimated by color and degree of consistence.

**COURSE AND TERMINATIONS.**—A very common history of ectopic gestation is, unfortunately, this: A woman becomes pregnant, gives all the ordinary symptoms of that condition, presents none which call for special examination, is suddenly seized with agonizing pain in the abdomen, rapidly becomes collapsed, and soon dies. A post-mortem examination reveals a ruptured Fallopian tube and a small fœtus, probably between the tenth and fourteenth week of development, in the peritoneal cavity, surrounded by a mass of coagulated blood. No lesson can be learned from the case, no maxim put on record, by which repetition of such an accident may be prevented, and no rule established which can give us much comfort for the future.

Fortunately, these "cataclysmic" cases, as Barnes appropriately calls them, are by no means the rule. Nevertheless, they have always occurred, and probably will always do so to the end of time. Like the "apoplexie foudroyante" of the French, their invasion is so sudden and so overwhelming that the resources of our art are powerless to withstand them.

In other cases the rupture occurs; a large hæmatocele results; the patient rallies; by slow degrees the mass of blood is absorbed and the

<sup>1</sup> *Manual of Gynecology*, p. 555.

fœtal bones become encapsulated, or an irritation of surrounding parts is excited by them, and they are extruded by the abdominal wall, the rectum, the vagina, or the bladder.

In some cases the pregnancy advances to full term; at the end of the ninth month labor-pains come on; the unsuspicious obstetrician examines by touch, and, to his amazement, finds that the labor is a false one, the cervix small and contracted, and the uterus empty. It is extraordinary how promptly the child dies under the influence of these spurious pains.

In the most remarkable case of my list of thirty-three, Dr. Jewett saw the patient one night, during which "hard labor" lasted, the child being alive, and, sending for Dr. Griswold the next day, a thorough exploration proved that the child was not in the uterine cavity and that it was dead.

After the death of the child one of a variety of terminations may occur. The placenta shrivelling and becoming non-vascular, and the liquor amnii being absorbed, the fœtal body becomes mummified, calcified (a lithopædion resulting), or a change of saponaceous character alters it into adipocere. Changed in this manner, the ectopic fœtus may remain for ten, twenty, thirty or forty years within the vicarious uterus, causing no other inconvenience than that resulting from its mechanical results.

Very generally, however, the liquor amnii assumes a puriform appearance, and hectic fever with its exhausting concomitants develops, or the angular surfaces of the fœtal body excite abscess or create absorption of tissue, which results in exhaustion and death or in extrusion and the mother's recovery.

The powers of the absorbents in removing the extra-uterine fœtus and its envelopes are truly wonderful. Some years ago Leopold of Leipzig published in the *Archiv für Gynäkologie* some interesting experiments which bear upon this subject. Performing laparotomy upon a non-pregnant rabbit, he placed within the peritoneal cavity embryonic rabbits at different periods of development, two and a half, five, six, and eight centimeters in length. In one case peritonitis ensued, the rabbit died, and the fœtus underwent such rapid disintegration that in the case of the smallest embryo introduced no trace was found on the second day. In the other cases, where peritonitis did not supervene, the animals were killed in a period varying from one to ten weeks, and it was found that the fœtal rabbits had, as a rule, been encapsulated, a great deal of the fleshy portions of the fœtus being absorbed and the skeleton remaining. From this experiment Dr. Leopold was led to believe that the recovery of patients who have suffered from rupture of the Fallopian tube and escape of the fœtal mass into the peritoneal cavity is much more common than is generally



supposed—a position which I would fully indorse from my own experience.

A woman of forty-five had been married fifteen years, but thought that she had never been pregnant. Early in married life she was supposed to be so, but she had never miscarried and had never borne a child. She came to me with a cyst the size of the head of a child a year old, and a hard round tumor which I supposed to be a calcareously degenerated fibroid behind the uterus. In three months from the time when I first saw her she fell suddenly into an almost collapsed state, and suffered greatly from pain in the tumor, which nearly doubled its size in a day or two. Her condition became so desperate after this that I operated to give her the only chance for life which presented itself. A large blood-cyst was emptied, and from the distended pouch of Douglas I shelled out the skull of a child of probably six months of foetal life. She had suffered fifteen years before from abdominal pregnancy, the child had died, and all but the skull had disappeared by absorption.

**DURATION.**—Extra-uterine pregnancy of any variety may reach full term, no injury resulting to mother or child. But this occurrence, which is common when the fœtus has the whole peritoneal cavity in which to grow and from which to take its nourishment, is rare in the tubal, ovarian, and interstitial varieties. I shall rest for authority in this matter upon Hecker, whose excellent statistical labors are known to all, and Cauwenberghe, for whose reports and opinions I am indebted to the excellent translation of M. Charpentier's<sup>1</sup> article upon "Extra-uterine Pregnancy," made by Dr. E. H. Grandin of this city.

Ectopic pregnancies as to duration observe this order: of shortest duration are the interstitial; next, the tubal; next, the ovarian; and the longest, the abdominal.

Of 26 cases of interstitial pregnancy,

The duration in	1 case was	1 month.
" " "	2 cases "	about 3 months.
" " "	12 " "	3 "
" " "	3 " "	4 "
" " "	1 case "	5 "
" " "	7 cases "	not noted.

Of 88 cases of tubal pregnancy,

The duration in	3 cases was	4 to 5 weeks.
" " "	17 " "	4 to 6 "
" " "	9 " "	6 to 7 "
" " "	13 " "	6 to 8 "
" " "	4 " "	2 months.
" " "	17 " "	3 "

<sup>1</sup> *Cyclopaedia Obstet. and Gynecol.*, vol. ii.

The duration in 11 cases was 4 months.

"	"	"	4	"	5	"
"	"	"	2	"	6	"
"	"	"	2	"	7	"
"	"	"	6	"	9	"

In 185 cases of abdominal pregnancy,

The duration in 1 case was 15 days.

"	"	"	1	"	3 weeks.
"	"	"	18 cases	"	1 to 2 months.
"	"	"	4	"	1½ to 2½ "
"	"	"	5	"	3 "
"	"	"	22	"	3 to 5 "
"	"	"	15	"	6 to 8 "
"	"	"	18	"	9 "
"	"	"	6	"	10 to 12 "
"	"	"	24	"	1 to 2 years.
"	"	"	10	"	2 to 3 "
"	"	"	23	"	4 to 10 "
"	"	"	1 case	"	11 years.
"	"	"	4 cases	"	15 "
"	"	"	2	"	16 "
"	"	"	2	"	20 "
"	"	"	1 case	"	22 "
"	"	"	1	"	25 "
"	"	"	3 cases	"	26 "
"	"	"	3	"	28 "
"	"	"	6	"	30 "
"	"	"	3	"	33 "
"	"	"	1 case	"	35 "
"	"	"	1	"	39 "
"	"	"	2 cases	"	40 "
"	"	"	4	"	46 "
"	"	"	2	"	47 "
"	"	"	2	"	50 "
"	"	"	1 case	"	54 "

MORTALITY.—Kiwisch states it at 82.5 per cent.; Hennig, in 150 cases of tubal variety, reports 88 per cent. as fatal; and Parry, out of 499 cases, fixes the mortality at 67.20. Out of Parry's 499 cases, 336 died—147 from rupture of cyst, 54 from exhaustion, 24 from peritonitis, 4 from hemorrhage, 8 from intestinal obstruction, 4 from septicæmia, etc.

Out of my 33 cases, as will be more fully stated hereafter, 22 recovered and 11 died—a percentage of recovery equal to two-thirds.

Speaking of the condition in a general way, and not classifying the different varieties, Hart and Barbour<sup>1</sup> declare that "more than four-fifths of the cases end fatally."

Well may De Sinéty remark: "On voit d'après toutes les statistiques

<sup>1</sup> *Manual of Gynecology*, p. 554.

que quelle que soit sa forme, la grossesse extra-utérine est une affection extrêmement grave."

Were I asked to what I attribute the good results obtained in my cases, I should feel forced, in simple candor, to run the risk of the charge of egotism and to reply: "I attribute it to three influences: first, early and positive diagnosis; second, the prompt resort to destruction of the life of the fetus during the early months (of 12 thus treated all recovered); and third, to an equally prompt resort to surgery in the later." It is true that out of 12 cases submitted to operation, 6 recovered and 6 died, but I feel sure that without a resort to surgery all would have been lost.

SYMPTOMS.—As has been already stated, ectopic gestation sometimes presents no symptoms whatever, the first evidence of the existence of the condition being yielded by the occurrence of rupture.

Fortunately, this is the exception and not the rule. The manner in which the condition is most frequently discovered is this: A woman becomes pregnant, and announces the fact to her friends. As the sixth or eighth week is reached some irregularity in the signs of pregnancy, such as sanguineous discharge, with pain in one iliac fossa and down the thigh, renders her anxious, and she reports the fact to her physician. Upon examination he discovers a hard and slightly tender mass on one side of the uterus, and, his suspicions being aroused, he submits the case to full investigation, which results in diagnosis. Or a woman has reached the full term of gestation, having experienced some discomfort, but not sufficient to cause her to report it to her medical attendant. Labor announces itself by uterine contractions, and the doctor is sent for. He examines, and to his surprise discovers not only that labor has not set in, but that the uterus does not contain the child; upon this a full investigation is made, and the result is a diagnosis.

Still, a third method of discovery is met with: A woman of a low grade of intelligence calls for medical aid on account of an abdominal tumor, gives a history of false labor and supposed spurious pregnancy, and, being carefully examined, is discovered to have a fetus extra utero.

These are the methods merely by which suspicion is so far excited in the mind of patient or of physician as to prompt an investigation. Those by which a diagnosis is reached are of a very different order. The most reliable rational signs are these, engrafting themselves upon the ordinary signs of normal pregnancy:

- 1st. Sanguineous flow of greater or less persistency;
- 2d. Occasional gushes of blood occurring without assignable cause and disappearing without treatment;
- 3d. Iliac pain sometimes extending down the thighs;
- 4th. Paroxysmal pelvic pain;

5th. Symptoms of abortion attended with expulsion of pieces of decidua without expulsion of a fœtus;

6th. Recurrent pelvic inflammations suddenly developing;

7th. As the fourth month is reached symptoms of pressure, as if from a retroverted gravid uterus, frequent micturition, etc.

If in a pregnant woman who presents in her symptoms the peculiarities just mentioned there be discovered in the pelvis a mass of ovoid shape, on one side of or behind the uterus, which is slightly movable, tender upon pressure, and which obscurely gives the impression that it contains fluid, the probabilities are very great that ectopic gestation exists. If under the influence of ether thorough examination of the mass shows that it is not a phlegmon in one broad ligament, or an hæmatocele (of rare occurrence during pregnancy), and by careful ballottement the drop of a small solid body can be felt (as it very rarely is), this probability becomes greatly increased. If the passage of an interrupted galvanic current of twenty cells produces within forty-eight hours a flaccidity in this mass, a general improvement in symptoms, and a sudden arrest of the progressive signs of pregnancy, this probability becomes as much a certainty as diagnosis often is in cases of disease attended by some obscurity.

It may be doubted whether at a very early period ballottement is ever obtainable. I assert positively that in three cases of tubal pregnancy I have appreciated it, and demonstrated it to others as early as in the third month. As an exception it will be met with, not as a rule.

While watching the case and waiting for a diagnosis the rapid growth of the tumor becomes a sign of great value.

As to the differentiation of the varieties, I have little to say: first, because we know very little upon the point; and second, because the determination of it is of little importance as to treatment. If the gestation be tubal, spasmodic contractions will occur which will be absent in the abdominal and ovarian varieties; if it be interstitial, the uterus will enlarge as much as if the pregnancy were normal.

PHYSICAL SIGNS.—Some of these have just been given, but I deem it best for conciseness to repeat them here. The uterus is usually found enlarged, lifted up in the pelvis, and pressed forward or laterally by a tumor which exists posterior to it or on one side. This tumor is generally found to be sensitive upon pressure and bearing evidences of great hyperæmia, which gives a violet hue to the whole vagina. Its growth may be marked by daily changes. Such a tumor accompanied by (*a*) the gastric and mammary symptoms of pregnancy; (*b*) cessation of menstruation; (*c*) enlargement of the uterus; (*d*) the purple hue of the vagina; (*e*) evidences of ballottement; (*f*) colicky pains in the pelvis, with tendency to collapse after their occurrence; and (*g*) irreg-



ular bloody flow from the uterus,—would give good ground for diagnosis of ectopic gestation.

**DIFFERENTIATION.**—The diseases with which extra-uterine pregnancy is most likely to be confused are—

- Inflammation or abscess of the broad ligament ;
- Pelvic hæmatocele ;
- Retroversion or retroflexion of the gravid uterus ;
- Fibrous or fibro-cystic tumor ;
- Ovarian tumor ;
- Dermoid cyst ;
- Parovarian cyst ;
- Conception in a rudimentary horn of a double uterus ;
- Fluid accumulation in the Fallopian tubes.

Very often in the beginning it is difficult to decide whether the case is one of extra-uterine pregnancy attended by the usual uterine enlargement, or a case of normal pregnancy attended by some pelvic neoplasm. Under these circumstances a clear statement of the necessities of the case should be made to the family, and the uterine cavity thoroughly explored by rapid dilatation of the cervix and investigation by means of the finger. In inflammation or abscess of the broad ligament there are no signs of pregnancy and no disorders of menstruation, while both rational and physical signs will point to a condition of acute inflammation.

Pelvic hæmatocele gives no previous history of pregnancy, occurs with great suddenness, and, while sometimes a result of ectopic gestation, presents to the touch a tumor entirely different from that condition.

From posterior displacement of the gravid womb a diagnosis may be usually arrived at by placing the patient in the knee-chest position and very cautiously lifting the fundus.

Fibrous, fibro-cystic, ovarian, and parovarian tumors are not tender, present no symptoms of great pelvic hyperæmia, are usually painless, and give none of the grave symptoms attendant upon ectopic gestation.

The same remarks may apply to dermoid cysts.

From pregnancy in a rudimentary horn of a double uterus a diagnosis of ectopic gestation must necessarily be very difficult, and could be accomplished only by repeated and thorough examination under anæsthesia.

After all is said with regard to the diagnosis of ectopic gestation, it must be added that a positive conclusion is very generally difficult and often impossible. It is not uncommon to hear practitioners blamed for deaths occurring from rupture of ectopic foetal sacs when no diagnosis had been made. Such censure is highly unjust and reprehensible. Diagnosis in these cases, even when suspicion is excited, is, as I have

said, usually difficult and sometimes impossible. Surely when suspicion is not excited by decided symptoms it is manifestly unjust to reflect upon the medical man who has had the misfortune to have the occurrence take place in his practice.

**CAUSES OF DEATH.**—These may thus be summed up: shock, hemorrhage, septicæmia, exhaustion from hectic symptoms, peritonitis, perforation of important viscera by bones.

**TREATMENT.**—No one can to-day write authoritatively or dogmatically upon the treatment of ectopic gestation. Many points connected with it are still unsettled, and it will require years of careful observation and cautious consideration before they can be decided. The circumstances, too, which surround each individual case will have to receive due weight in the determination of the course which should be adopted in its management. The same rules which would, for example, apply to a woman suffering from this condition who is in contact with some medical centre where the most consummate skill can be obtained, a complete diagnosis made, and all the hospital advantages of our day put at her disposal, could not with advantage be followed in the case of one living in an obscure country district and deprived of such resources.

Upon one point in connection with this subject all will agree—namely, the fact that the death of the fœtus during the course of abnormal gestation in any part of its duration is an unqualified advantage. Previous to this occurrence intense vascularity constitutes at once the most striking feature of the condition and its most dangerous characteristic. After it a rapid diminution of this feature usually, though not always, occurs in the placenta, the uterus and its annexæ, and the entire tissues of the pelvis. Before it operative interference is for this reason much more hazardous than it is after it, and much more difficult of accomplishment.

Before entering into further considerations upon treatment, the fact must likewise be mentioned that prior to the twelfth week of gestation the fœtus is very apt to be found in the Fallopian tube, and thus the whole sac and its contents may be removed; that later than this time, either from displacement or laceration of the tube containing the fœtal ball, attachment of the placenta to some of the abdominal viscera will likely be met with; and that at full term the placenta is found attached to the anterior abdominal wall and in the line of abdominal incision once in every six or seven cases.

In deciding as to any special line of treatment, it must be borne in mind that while in the practice of obstetrics applied to normal gestation two lives have always to be prominently considered, here but one usually presses its claims upon our consideration; and this because of the great danger to the mother from an effort to save the child, and of the

slight probability which exists that success would attend an effort purchased at such a cost. I admit that in ectopic gestation which has advanced beyond the seventh month the child's life should be considered; but the cases of this character will be rare in comparison with those diagnosticated at an earlier period.

The views which I shall express upon this point are based upon an exceptionally large experience, and have been adopted after mature reflection; and yet I confess that I feel that fuller experience and deeper reflection may in time cause me to modify them. To lay them before the reader as fully as possible, I must divide my subject and consider treatment as applied to ectopic gestation after rupture of the foetal sac; before the period of foetal viability; and after the period of foetal viability.

*Treatment of a Case after Rupture of the Sac.*—After rupture of the ectopic sac it may be supposed that laparotomy would be invariably indicated as the only procedure consonant with good surgery; but this is not the case. During the profound shock which very generally attends such rupture operation is of course impossible. After recovery from this the case should be carefully watched: if evidences of continuing hemorrhage, of tendency to prostration, of peritonitis, or of septicæmia exist, the abdomen should be promptly opened, the effused materials carefully removed, the pelvic cavity thoroughly cleansed, and the foetal nidus extirpated or stitched to the abdominal wound, so as to allow of thorough drainage, as may appear most advisable to the operator in each individual case.

On the other hand, if, after rupture, the case progresses favorably, behaving like an ordinary one of hæmatocoele, laparotomy should be avoided and the efforts of nature encouraged and relied upon. In my thirty-three cases I have had one of unquestionable sac-rupture entirely recovering under this plan, and it was in a woman whose nervous system rendered it very desirable that a capital operation should be avoided.

In such cases, however, I would decidedly favor prompt and early action, unless those circumstances which I recently mentioned as opposing resort to operation exist in so marked a degree as to render action more dangerous than delay, great as this is pretty sure to be.

I know of but two cases of recovery after laparotomy for rupture of an ectopic sac in this country. One of these occurred in the practice of Dr. Johnstone of Danville, Kentucky, and the other in that of Dr. Gordon of Portland, Maine. This fact ought, however, by no means to discourage the procedure, for without doubt the future opens to it a promise which, for manifold reasons, the past has failed to realize. The next decade will in all probability change the present record most decidedly for the better, but even if it does so, I do not believe that the conservative rule which I have here given will be annulled by that fact.

*Treatment of a Case before Rupture and before the Period of Viability.*

—Should the diagnosis of extra-uterine pregnancy be pretty certain, and the patient's surroundings and position in life be such as to enable her to command a reliable operator and good nursing, if rupture appear to be imminent from the great distension of the sac and the frequency and severity of tubal contractions, resort should at once be had to laparotomy. The fetal nest should after ligation be entirely removed, or, if this be impossible, it should be laid open by incision, its contents removed, the edges of the sac stitched to the abdominal wound, and complete and efficient drainage established.

On the other hand, should the diagnosis be doubtful, as such diagnoses so often are; should there be no reason for haste; should the medical attendants be men unfamiliar with abdominal surgery, and the hygienic surroundings of the patient be bad,—the life of the child should be promptly destroyed and the question of operation as to time and necessity be left for future consideration.

I would state the matter even more positively than this in the following way: Unless the imminence of rupture render fœticide efforts hazardous and delay for this purpose unadvisable, the life of the fœtus should always be destroyed prior to fœtal viability, before laparotomy is resorted to. After fœtal death, from the very instant that it is accomplished diminished vascularity rapidly establishes itself, and every day, every hour, renders the chances of a subsequent operation better. If the pregnancy be in the early months—say, for example, in the first four—nothing further will usually be necessary in the way of interference. If it has advanced to the sixth, what evil will attend the destruction of fœtal life? In a fortnight after it laparotomy may be practised, and if it be so, how much greater would be the chances for a successful issue! Unless, then, there be some especial and weighty reason for immediate resort to laparotomy at this period, I would strongly urge the claims of fœticide either as a final resort or as a preparation for the future and more radical procedure.

Ectopic gestation with our present improved methods of diagnosis will henceforth be frequently discovered early. If so—not if a positive diagnosis be made, but if a strong suspicion exist that a child is developing outside of the uterus, whether in the tube, the ovary, the abdomen, or the uterine wall—a strong electric current should be passed through the suspected mass. Then the surgeon should watch for bad symptoms. If signs of septicæmia, septic peritonitis, or hectic fever show themselves, and if it be regarded as probable that the retention of the fœtal mass is the source of the trouble, laparotomy is as much at our disposal as it was originally, and will be attended by less danger.

Far be it from me to belittle exact diagnosis or depreciate any of its claims, but let me ask those who have seen these cases as frequently



managed at the bedside which course would appear to them the more dangerous—to expose the patient to a half dozen consultations, to explore the suspected mass with considerable force and to wait for light as to diagnosis, or to run the risk of passing a strong interrupted galvanic current through one of those masses which will usually offer themselves for differentiation from ectopic gestation—such masses, for example, as uterine fibroids, ovarian or parovarian cysts, phlegmons of the broad ligaments, or fecal tumors? If the diagnosis of ectopic gestation is correct, great good will at once show itself in improvement of symptoms and the danger to the patient will be greatly diminished; if it be incorrect, what harm will have resulted? If the period of infantile life be not too much advanced for absorption of the foetal mass to occur with safety, the least hazardous exit from the difficulty will have been selected; should laparotomy become necessary at a later period, it will prove much safer after crippling of the placenta and diminution of the vascularity of the whole product of conception and of the parts surrounding it. Even if it were certain that laparotomy would become necessary in a few days or weeks, the danger of the operation would be greatly diminished by the use of the electric current. Cases of this nature, in which operation at or near full term in the child's interest has been resorted to, have been, and probably will be, rare, for few conscientious practitioners will feel warranted in exposing a mother to the dangers attendant upon months of waiting when the prospects of ultimately saving the child's life are so small.

As the matter now stands, the question arises whether, when a diagnosis is made at the seventh month of abdominal pregnancy, it is right to await the coming of the ninth, and then to operate with the slight chances of saving the child which appear to attend the procedure. I should be opposed to the plan of waiting, and should favor the performance of laparotomy at once.

There are several methods by which foetal death may be brought about. I mention them in the order of my appreciation of their value: 1st, the galvanic or faradic current without acupuncture; 2d, the same with acupuncture; 3d, the aseptic evacuation of the liquor amnii by Dieulafoy's aspirator; 4th, the injection of morphia hypodermatically into the sac. Of these methods, I very decidedly prefer the first. So efficient have I found it in many trials of its power that I am led to the belief that it should supersede all others. The electric current with acupuncture might be necessary in the case of a six months' child of vigorous type, but the necessity of acupuncture even then should be admitted only after failure with electricity without it.

In my mind, this axiom should to-day be accepted as a rule in ectopic gestation prior to viability of the child: *A diagnosis of extra-uterine pregnancy being arrived at, destroy foetal life as promptly as possible.*

Should the pregnancy have advanced to full term and the child die, as it always does at this time from the spurious labor which then occurs, the surgeon should quietly await indications for interference, feeling assured that as time passes the placenta is probably shrivelling and all the parts becoming less and less hyperæmic.

Should electricity fail to kill the fœtus, either from the feeble way in which the attendant inefficiently employs it or from some inherent want of power which I have not yet seen it develop, laparotomy should be promptly resorted to even in the early months of ectopic gestation.

*Treatment of a Case after the Period of Fœtal Viability.*—At this time it appears to me that it is the duty of the physician to consider the claims of the child and to give it a chance for life, even at the great risk for the mother which is involved in such a course. The laborious and conscientious labors of Dr. R. P. Harris of Philadelphia have placed upon record thirty cases operated upon under these circumstances by what is most inappropriately termed the primary operation. Harris' tables are given on pp. 194 and 195, and an examination of them will show that out of 30 cases, only 5 women and 22 children passed through the terrible ordeal with life, and many of the children delivered alive died within short periods after birth.

It must, however, be borne in mind that most, indeed nearly all, of these cases occurred before modern abdominal surgery, with its crowning glory antiseptics, came into existence, and that the mortality which attended them cannot be accepted as that which would attend them to-day. Then, too, let us reflect that were we now to accept the dogma that primary laparotomy under these circumstances should be abandoned, we would be closing the doors against future advance, future progress, and future triumphs in this field. The sad recital which Dr. Harris makes to-day may be replaced in the future by one correspondingly brilliant if we labor to that end. It cannot be so if we accept the worst issue which could come to us as a final and irretrievable one.

In support of this position I quote the statement<sup>1</sup> made by Mr. Tait of Birmingham, England, that he has performed three primary laparotomies with the brilliant results of "one death of a mother and no deaths of the children."

This is one of the unsettled questions of treatment of ectopic gestation to which I recently alluded as belonging to a class upon which I felt that I might change my mind with increasing experience. I trust that I may never do so, for to make such a change would be to accept the humiliating conclusion that with all its modern triumphs surgery had in this field utterly failed to improve upon the distant past.

It is needless to say that all these operations should be performed under the strictest antiseptics.

<sup>1</sup> *Amer. Journ. of Obstet.*, Mar., 1888.

Table of Primary Laparotomies, prepared by R. P. HARRIS, M.D.

No.	Date.	Operator.	Locality.	Age.	Number of Pregnancy.	Duration of Gestation.	Result to Woman.	Result to Child.	Remarks.	References.
1	Aug. 29, '13	Dr. Brückert.....	Berlin.....	32 3d ..	9 months.	Died in 40 hours....	Lived .....	.....	Sac ruptured, and peritonitis before operation. Intestines could not be replaced. Death from peritonitis. Woman died of slow septicæmia.	<i>Magazin für die gesamte Heilkunde</i> , Knist, 1819, Ed. iii. S. 1.
2	Dec. 7, '11	Dr. Dominico Novara.....	Porto Maurizio.....	38 5th ..	9 months.	Died in 33 days....	Lived .....	.....	Woman died of subacute peritonitis. Placenta left in place in the iliac fossa.	<i>Journ. univers. des Sciences méd.</i> , 1816, t. iii. 119-124.
3	.....	Dr. Mattfeld.....	Tübingen .....	24 3d ..	9th mo....	Died in 20 days ...	Lived .....	.....	Placenta removed by tearing and eutting. Death from "collapse."	<i>Neue Zeitschrift für Geburtsh.</i> , 1834, Bd. i. S. 131.
4	Mar. 1, '41	Dr. Kauff.....	Germany (?).....	(?) 1st.	34 weeks....	Died in 24 hours....	Died in 50 hours....	.....	Placenta removed by tearing and eutting. Death from "collapse."	<i>Medizinische Annalen</i> , Heidelberg, 1842, Ed. viii. S. 439.
5	..... 1852	Prof. Pietro Lazzati.....	Milan.....	(?) ..	9 months.	Died in 29 hours....	Alive, but did not respire.	.....	Operation demanded by serious condition of patient.	<i>Monitore del Parto Mechanico ed Instrumentale del Lovati</i> , Milano, 1854, p. 194.
6	Mar. 27, '63	Prof. Eugène Koerberé .....	Strasbourg.....	39 3d ..	9 months.	Died soon after operation.	Died on 2d morning.	.....	Operation in <i>extremis</i> ; prior-existing peritonitis; hemorrhage from a tear in placenta.	<i>Gazette méd. de Strasbourg</i> , 1863, t. x. p. 160.
7	Apr. 21, '64	Dr. Robert Greenhalgh.....	London ..	40 2d ..	8 months.	Died in 32 hours....	Died in a few minutes.	.....	Operation performed in <i>extremis</i> .	<i>Medical Mirror</i> , Nov., 1864, p. 689.
8	Oct. 5, '72	Mr. John Scott.....	London .....	23 1st.	30 weeks....	Died in 5 hours....	Died on 2d day ....	.....	Pulse 135; temp. 104.2° at operation. Death from heart clot.	<i>Trans. Obstet. Soc. London</i> , 1873, vol. xv. p. 309.
9	Aug. 14, '75	Mr. Thos. Rich'd Jessop.....	Leeds .....	26 2d ..	33-34 wks.	<i>Recovered</i> .....	Lived 11 months....	.....	Fetus free in abdomen; no cyst. Patient in critical condition.	<i>Ibid.</i> , 1876, vol. xviii. p. 261.
10	Mar. 5, '76	Prof. Otto Spiegelberg.....	Breslau.....	36 2d ..	40 weeks....	Died in a few hours.	Lived 3 months ....	.....	Sac ruptured; peritonitis; pulse 148 before operation; placenta incised; severe hemorrhage.	<i>Archiv für Gynikol.</i> , 1879, Bd. xiii. S. 74.
11	May 25, '77	Dr. Heywood Smith.....	London .....	32 4th ..	9 months	Died in 22 hours....	Heart beat 20 to 40 minutes.	.....	Woman believed to have died of hemorrhage.	<i>Trans. Obstet. Soc. London</i> , vol. xx., 1878, p. 5; also by letter, 1887.
12	Nov. 5, '77	Dr. Henry Gervis.....	London .....	39 9th ..	36½ wks....	Died in 56 hours ..	Died in 6 hours ....	.....	Woman died of hemorrhage.	<i>Brit. Med. Journ.</i> , vol. ii., 1877, p. 884.

13	Ang. 19, '78	Dr. Ernst Fraenkel.....	Breslau.....	34 3d .. 33½ wks....	Died soon after operation.	Died in 24 hours....	Woman died from detachment of placenta.	<i>Archiv für Gynäkol.</i> , 1879, Bd. xiv. S. 197.
14	May 29, '79	Prof. Carl Schroeder.....	Berlin ..	33 7th .. 34½ wks....	Died in 36 hours....	Lived ..	Death from hemorrhage, in operation and on following day.	<i>Zeitschrift für Geburtshilfe und Gynäkol.</i> , 1880, Bd. v. S. 115.
15	June 29, '79	Dr. M. Hofmeier.....	Berlin ..	38 7th .. 8 months	Died in 36 hours....	Lived ..	Woman died of hemorrhage.	<i>Norsk Magazin for Lægevidenskaben</i> , Juni, 1880, T. B. 6te Hefte, S. 86.
16	Dec. 19, '79	Dr. B. Christian Vedeler.....	Christiania ..	40 4th .. 35 weeks....	Died the next afternoon.	Died the next day....	Patient had gonorrhoical endometritis, also peritonitis, at time of operation.	<i>Archiv für Gynäkol.</i> , 1880, Bd. xvi. S. 362.
17	Jan. 10, '80	Prof. C. C. Th. Litzmann.....	Kiel ..	29 2d .. 9 months	Died in 16 days....	Died in 15 minutes....	Signs of sepsis on 12th day, with repeated hemorrhages; placenta removed on 16th day.	<i>Obstet. Jouru. Great Brit. and Ireland</i> , Oct. 1880, vol. ii. p. 577.
18	Jan. 31, '80	Mr. Lawson Tait.....	Birmingham ..	33 7th .. 9 months	Died on the 4th day.	Lived ..	Death attributed to "prolonged shock."	<i>Trans. Am. Gynecol. Soc.</i> , 1882, vol. vi. p. 461.
19	May 11, '80	Dr. Henry P. C. Wilson.....	Baltimore.....	24 4th .. 9 months	Died in 90 hours....	Lived 18 months....	Patient had high pulse and temperature; collapse; probably septic.	<i>Hygiena</i> (Stockholm), 1881, vol. xviii. p. 169.
20	July 26, '80	Dr. W. Netzel.....	Stockholm ..	28 3d .. 9 months	Died in 48 hours....	Died in 48 hours....	Placenta divided in operation, producing severe hemorrhage.	<i>Berliner klinische Wochen.</i> , Dec. 26, 1881, Bd. xviii. S. 753-775.
21	July 9, '81	Dr. August Martin.....	Berlin ..	39 3d .. 7 months	Recovered ..	Did not breathe, cold pulsated.	Fetus had a large occipital encephalocele.	<i>Gazetta Medica di Torino</i> , 1881, vol. xxxiii. p. 557-557.
22	July 13, '81	Dr. Giuseppe Beisone.....	Pinerolo, Italy ..	40 1st .. 9 months	Died on the 6th day.	Lived ..	Patient appears to have died of septicæmia	<i>Berliner klinische Wochen.</i> , No. xxix, July 20, 1885, S. 465.
23	Feb. 15, '82	Dr. Hildebrandt.....	Königsberg.....	28 2d .. 9 months	Died on the 10th day.	Lived ..	Woman almost moribund from peritonitis when operated on; sank slowly afterward.	<i>Ibid.</i>
24	Oct. 3, '82	Dr. Hildebrandt.....	Königsberg.....	26 7th .. 34½ wks....	Died in 17½ hours	Asphyxiated, was not resuscitated.	Woman operated on in <i>ex-utero</i> , and died in collapse.	<i>Fruch. St. Petersburg</i> , 1886, vii. 76-115; <i>Repetoire universel de Nouvelles Archives d'Obstetrique et de Gynecol.</i> , 25 July, 1886, pp. 277-279.
25	Nov. 4, '85	Prof. Lazarewicz.....	Kharkoff ..	27 2d .. 9 months	Recovered ..	Lived 21 days.....	Cyst and part of placenta drawn out and pursed up in closing abdominal wound	<i>Hospitals Tidende</i> , Sept. 22, 1886, p. 889.
26	Jan. 29, '86	Prof. A. Stadtfeldt.....	Copenhagen ..	29 1st .. 9 months	Died in 38 hours....	Lived ..	Woman apparently died of internal hemorrhage.	Communicated by the operator, April 19, 1887.
27	Mar. 30, '87	Dr. Joseph Price, Phila.....	Camden, N. J....	37 5th .. 7½ mos.....	Died in 11 days....	Died in 4 hours....	Sac ruptured, and peritonitis prior to operation. Woman died of hemorrhage.	<i>Brit. Med. Jouru.</i> , Dec. 3, 1887.
28	.....	Dr. John Williams.....	London ..	30 2d .. 35th week	Recovered ..	Alive.....	.....	<i>Ibid.</i>
29	.....	Mr. F. H. Champneys.....	London ..	..... 7th mo....	Died in 11½ hours	Alive.....	Woman died of septicæmia.	<i>Præter med. Woch.</i> , 48, 49, 50, 1887.
30	Oct. 29, '87	Prof. Ang. Breisky.....	Vicenna.....	30 .. 9 months	Recovered ..	Lived 20 days.....	Sac intraligamentous excised	



I have not deemed it necessary, or in character with an essay of this kind, to go into details as to the various operative procedures alluded to. For these I would refer the reader to the many excellent treatises which exist upon these subjects, and especially to two recent ones—those of Drs. Doran of London and Greig Smith of Bristol.

*Table embodying Results of Thirty-three Cases occurring in the Practice of the Writer.*—The following table presents the method of treatment pursued and the results obtained in the 33 cases which have come under my observation: In 6, rupture of sac occurred; of these, 5 died and 1 recovered; 1 only of them was submitted to operation, and that ended fatally. In 8, laparotomy was practised, six times by myself, once by Dr. Briddon, and once by Dr. Lusk; 4 recovered and 4 died. In 3 cases aspiration was employed; all died, none recovered, but these occurred before the days of antiseptics. In one case elyototomy was practised, and this recovered. In 12 cases, a little less than one-half of all the cases seen by me, exclusive of those in which the cyst had ruptured, electricity was employed as a foeticide; of these, all recovered, none died. In 3 cases, exclusive of those in which the sac had ruptured, an expectant plan was pursued; 2 recovered and 1 died. In all of these 3 cases foetal death occurred from unassignable cause, and foetal bones were extruded.

Of the whole 33 cases, 22 recovered and 11 died. Excluding the six cases in which the patients were first seen subsequent to rupture of the sac, four-fifths of the entire number recovered.

# TUMORS OF THE BREAST.

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TUMORS of the breast are, next to those of the uterus, the most common of the new growths of the female sexual organs, and for this reason their study should prove as interesting to the gynecologist as it is to the surgeon. Unfortunately, few attempts have been made to base the clinical features upon the minute structure of mammary neoplasms, the majority of writers drawing their accounts from views expressed in prehistological days, so that their descriptions are not trustworthy. In my *Treatise on Tumors of the Mammary Gland*, published in 1880, I made the first systematic attempt to utilize modern histological researches in the investigation of the general pathology of neoplasms of the breast, and to apply the principles deducible from their anatomy and their life-history to their diagnosis and treatment. In the present article, instead of dealing in generalities, I have pursued a similar course, and have prefaced each form of tumor with a brief description of its histogenesis and its minute features, so that there should be no misunderstanding, and that a guide might be furnished to others who desire to enter upon this field of inquiry.

In order that all possible light may be thrown upon the etiology, course, and treatment of tumors of the breast, and that good material may accumulate for future analysis, I would suggest that the following points be considered by those interested in adding to our fund of knowledge upon the subject :

What influences has age, menstruation, marriage, childbearing, nursing, pregnancy, lactation, sore nipples, traumatism, badly-constructed corsets, and puerperal or ordinary mastitis upon their development? If supposed to arise from injury or inflammation, note what lesions these factors produced and the date of the appearance of the neoplasm. Describe the variety and course pursued by a tumor that may have appeared during pregnancy or lactation ; and describe the course of any tumor that may have been modified by the breast undergoing involution. If there be a family history of inheritance, endeavor

to trace it to ancestors—if possible through more than one generation—and not merely to relatives, and state what organ was affected in the ancestor and the variety of tumor. Note the structure and clinical histories of tumors occurring in impubic subjects, and the same points in reference to carcinoma developed before the thirtieth year. Describe the nature of symmetrical growths, or of two or more tumors met with in one breast, and the development of carcinoma from an adenoma or an adenoid fibroma, and of a sarcoma from a fibroma. Trace all cases of cystic sarcoma, about the malignancy of which many writers are obscure. Ascertain as accurately as possible the dates of certain clinical signs, as invasion of the neighboring tissues, the associated glands, and the viscera, and the date of death when the disease pursues a natural course and when an operation has been performed. Note the date and seat of recurrences and metastases, and describe post-mortem appearances. Trace the histories of cases, particularly those of sarcoma and carcinoma, to ascertain how long the patient remains well. It need scarcely be added that these data will be useless unless the tumor has been subjected to minute examination by a skilled observer.

#### CLASSIFICATION AND RELATIVE FREQUENCY.

Tumors of the breast include neoplasms and cysts, the former being new formations which tend to persist and increase, while the latter, as a rule, result from dilatation and retention of the secretion of the glandular apparatus. From the fact that the breast is made up of a dense connective tissue stroma in which the lacteal glands and ducts are intercalated, it is not very common to meet with a neoplasm in which the latter elements are not included in the growth. It is not proper, however, to regard tumors which contain both glandular and connective tissue constituents as examples of mixed growths, as one of these tissues must be subordinate to the other, thereby illustrating the rule of classification—*a priori fit denominatio*. In the connective tissue series of neoplasms the lacteal glands usually remain passive, and as the tumor grows they may partially or entirely disappear. Instead of being newly formed and predominant, the secreting elements are merely accessory, and represent the remains of preëxisting glands, contained, but widely separated, in a fibromatous, sarcomatous, or myxomatous matrix. If it be desired to recognize the persistence of more or less modified glandular tissue, the term adeno, or adenoid, may be used; but to include these tumors under the species adenoma or some of its various synonyms, as adenocoele, is manifestly incorrect, and serves to perpetuate ignorance as to the histogenesis and life-history of mammary growths. Pure clinicians are also responsible for the confusion which exists in regard to the epithelial

formations. Medullary, colloid, and atrophying carcinoma are so commonly confounded with soft sarcoma, myxoma, and contracting fibroma, and the converse, that these growths must continue to be examined anew. True adenoma, one of the rarest of neoplasms, is also in danger of being misunderstood in consequence of being described as epithelioma by Labbé and Coyne, Malassez and Deffaux, and other French writers. This is to be regretted, as epithelioma implies the structure of the growth as met with elsewhere. Even as a generic term it is most objectionable, unless carcinoma, which is also an epithelioma in the sense of its arising from epithelial elements, be designated atypical, carcinomatous, or infiltrating epithelioma, to distinguish it from adenoma, which would then be regarded as typical, noncarcinomatous, or circumscribed epithelioma.

In their histological construction many of the mammary tumors resemble the normal tissues. They differ, however, both in structure and texture from those of the matrix, so that the apparent likeness is mimetic. Hence, in their classification, instead of adhering to the modern custom of saying that they are formed upon the type or model of certain tissues, it is more philosophical to separate them in accordance with their origin from the secreting apparatus and periglandular connective tissue, and at the same time designate the tissue of which they are composed, making, however, a separate group of cysts. For these reasons I prefer the following combined genetic and anatomical classification :

## A.

- |   |  |
|---|--|
| 1. Typical neoplasms derived from the periglandular connective tissue, and constituted by mature or perfected connective tissue or its equivalents. | } Fibroma, or fibrous tumor ;<br>Myxoma, or mucous tumor ;<br>Lipoma, or fatty tumor ;<br>Chondroma, or cartilaginous tumor. |
| 2. Atypical neoplasms derived from the periglandular connective tissue, but representing embryonic or unripe connective tissue.                     |  |
| 3. Typical neoplasms derived from the secreting elements, and composed of acini and ducts.  |  |
| 4. Atypical neoplasms derived from the secreting elements, and composed of epithelium.  |  |
- } Sarcoma.
- } Adenoma, or glandular tumor.
- } Carcinoma.



5. Typical neoplasms which are derived from, and composed of, higher structures. } Angioma, or vascular tumor;  
Neuroma, or nerve tumor.

## B.

Cysts, which include the sacs due to obstruction of the ducts and the accumulation of the secretion of the lacteal glands, and cysts of new formation.

1. Cysts derived from the secreting elements, and due to the retention of the secretion from obstruction of the ducts. } Retention or glandular cysts.
2. Cysts due to the collection of fluid in the expanded and fused lymph spaces of the connective tissue. } Connective tissue or lymphatic cysts.
3. Cysts due to the formation of a sac around the embryo of the tænia echinococcus. } Hydatid cysts.

It will be observed that I have used the expressions typical and atypical, which are synonymous with homologous and heterologous of the older pathologists. In the typical growth a determined model is followed, so that there is a tumor-like reproduction of adult connective tissue or glandular elements. In the atypical neoplasms, on the other hand, the constituents either extend beyond their normal boundaries, or deviate in form, size, and grouping from the mature epithelial or connective tissue textures, and represent irregular proliferations.

The genetic classification of neoplasms has not met with general acceptance on the part of teachers of surgery, and many complain of the gradual abandonment of the division into benign and malignant, and find special fault with the term sarcoma, under which they say pathologists group tumors which possess the greatest possible diversity of clinical history. The term carcinoma, however, is open to the same objection; and many purely practical surgeons, in teaching that their benign growths are synonymous with adenocenes, connective tissue, or nonearcinomatous neoplasms, and that the malignant growths are equivalent to the carcinomatous tumors of the histologist, hold a position which is no longer tenable. With the view of including a certain class of the nonearcinomatous group, which some clinicians recognize as being partially malignant, they have coined a new expression, and describe sarcoma as a semimalignant or recurrent growth; but this clinical classification is even worse than the other, since sarcoma, as may be seen in the section on that affection, is more infectious than

ordinary scirrhus, and only yields in point of malignity to medullary carcinoma. It may be said, however, that the nearer the structure of a mammary tumor approaches that of the physiological adult tissues, whether these be connective or epithelial, the more innocent is the growth, and that the more it departs from the normal standard, or the more atypical it is, the more malignant is the new formation. If the clinician wishes to retain his classification, he should base it upon the fact, disclosed by modern histological investigations, that tumors which originate from the connective tissue have their innocent, semimalignant, and malignant representatives, while those which are derived from the epithelial elements include semimalignant and malignant formations. Thus, in the former series fibroma, lipoma, and chondroma are absolutely benign; myxoma is semimalignant, because it exhibits a tendency to reproduce itself after removal; and sarcoma, as I have just pointed out, is excessively malignant. Of the epithelial series, the malignant nature of carcinoma is familiar to every one, while adenoma recurs once in every five cases.

Of the relative frequency of mammary tumors it is difficult to form an estimate based upon accurate and extended records, since surgeons, for the most part, report their cases merely as adenoid and cancerous. The following table of 995 examples, however, may prove useful in throwing some light upon this point:

Authority.	Carcinoma.	Sarcoma.	Fibroma.	Adenoma.	Cysts.
Billroth: <i>Chir. Klinik</i> , Zurich, 1860-67, and Wien, 1868, 1869-70, and 1871-76 . . . . .	245	19	19	1	3
Heineke: <i>Beitrag zur Statistik der Mammatumoren</i> , p. 1 . . . . .	131	8	4	1	
Knester: <i>Langenbeck's Archiv</i> , Bd. xii. p. 616 . .	28	6	9	. .	3
Langenbeck: <i>Virchow's Archiv</i> , Bd. xviii. p. 51, and <i>Langenbeck's Archiv</i> , Bd. xxi., Suppt., p. 149 . . . . .	157	16	5	. .	2
Rose: <i>Deutsche Zeitschrift für Chirurgie</i> , Bd. xiv. p. 169 . . . . .	64	9			
S. W. Gross: <i>Private Notes</i> . . . . .	207	19	24	1	14
	832	77	61	3	22

Excluding cysts, which constitute only 1 out of every 45 tumors, it will be seen that of 973 neoplasms, 832, or 85.5 per cent., were carcinomatous, and 141, or 14.5 per cent., were noncarcinomatous. This, doubtless, is the true proportion, as I find that Bryant<sup>1</sup> records 400, or 83.16 per cent., of carcinomata, against 81, or 16.83 per cent., of adenoccles, which are equivalent, according to his views, to the noncarcinomatous growths; and Billroth<sup>2</sup> met with 375, or 85 per cent.,

<sup>1</sup> *A Manual for the Practice of Surgery*, 4th Amer. ed., pp. 769 and 773.

<sup>2</sup> *Die Krankh. der Brustdrüsen*, p. 134.

of carcinomata, against 65, or 15 per cent., of the connective tissue neoplasms.

As will have been noticed, lipoma, chondroma, and osteoma find no place in the table. While examples of fatty tumor, developed in the paramammary adipose tissue, are recorded by Warren,<sup>1</sup> Brodie,<sup>2</sup> Velpeau,<sup>3</sup> Cooper,<sup>4</sup> Roper,<sup>5</sup> and, more recently, by Billroth<sup>6</sup> and Bryk,<sup>7</sup> I am not aware of a single case of circumscribed lipoma occurring in the gland itself. Sir Astley Cooper<sup>8</sup> and Cruveilhier<sup>9</sup> have each described an instance of cartilaginous growth; but, in the absence of minute examination in the one and of a complete account in the other, the fact, to say the least, is very doubtful. Although Cooper's case was probably an ossifying chondroma, of which Lange<sup>10</sup> has recorded an example, Wacker<sup>11</sup> states that in the Pathological Institute of Rostock there is a specimen of true chondroma of the size of a hen's egg, made up of hyaline and fibrous cartilage, with here and there calcareous deposition. The partial transformation of fibrous and sarcomatous tumors into osseous tissue is not very uncommon, but a true osteoma has as yet not been observed. Bryk<sup>12</sup> has reported an example of petrified mamma, in which a deposit of calcareous salts had occurred in the stroma and caused atrophy of the acini and ducts. Of the neoplasms originating from and composed of higher tissues, Tripier<sup>13</sup> records two instances of amyelinic neuroma, while Bryant<sup>14</sup> briefly notes a vascular tumor of the mamma, and Image<sup>15</sup> and Conrad Langenbeck<sup>16</sup> have reported similar growths, which had extended, however, from the skin to the mamma itself. Hence, in speaking hereafter of the connective tissue neoplasms, I wish to be understood as referring to fibroma, sarcoma, and myxoma alone, and to these growths, along with adenoma, when alluding to the noncarcinomatous group.

#### THE EVOLUTION AND TRANSFORMATION OF MAMMARY NEOPLASMS.

The development and growth, or evolution, of the new formations of the mamma include processes which are, on the one hand, purely theoretical, and, on the other, strictly practical. Whether of epithelial or connective tissue derivation, they all originate through the multiplica-

<sup>1</sup> *Surgical Observations on Tumors*, p. 228.

<sup>2</sup> *Lect. on Surg. Path.*, p. 271.

<sup>3</sup> *Traité des Maladies du Sein*, p. 247.

<sup>4</sup> *Illustrations of the Diseases of the Breast*, p. 67.

<sup>5</sup> *Holmes' System of Surgery*, 2d ed., vol. v. p. 267.

<sup>6</sup> *Op. cit.*, p. 45.

<sup>7</sup> *Langenbeck's Archiv*, Bd. xvii. pp. 576 and 580.

<sup>8</sup> *Op. cit.*, p. 47.

<sup>9</sup> *Traité d'Anat. Path.*, t. iii. p. 824.

<sup>10</sup> *Medical Record*, vol. ii., 1881, p. 161.

<sup>11</sup> *Inaug. Dissert.*, Rostock, 1884.

<sup>12</sup> *Langenbeck's Archiv*, Bd. xxv. p. 808.

<sup>13</sup> *Dict. Encyclop. des Sci. Méd.*, sér. 2, t. iv. p. 408.

<sup>14</sup> *Op. cit.*, p. 692.

<sup>15</sup> *Med.-Chir. Trans.*, vol. xxx. p. 109.

<sup>16</sup> *Nosologie und Therapie der Chir. Krankheiten*, Bd. v. p. 83.

tion or proliferation of the preëxisting cells of the lacteal glands or the stroma and their descendants, either through direct hyperplasia and the primary production of the typical forms of the mother tissue or after the model of embryonic tissue formation. The latter plays a more important rôle than the former, since through it nearly all the neoplasms may arise. Just as in the embryo all tissues originate from masses of indifferent formative cells which have proceeded from the primordial cell, so in this mode of the development of tumors the tissues arise from collections of small, round, indifferent cells, which resemble those of the embryo or those of granulations. In the next stage these cells are converted into the tissues of which the tumor is composed, and the type followed here is the same as that which prevails in foetal development.

In the preceding section I divided the neoplasms of the mamma in accordance with their derivation from the glandular or periglandular constituents of the organ. While this view of their histogenesis is most simple, and involves the belief that epithelium alone produces epithelium, and that connective tissue arises solely from connective tissue elements, every one who is at all familiar with investigations in this direction is aware that the origin of some of the new growths is still, and will probably always be, a disputed point.

However interesting it might prove, my space will not permit me to examine the contradictory statements which prevail on the development of these neoplasms, and particularly the carcinomatous, and which involve the question whether a cell belonging to a certain class can be the offspring of a cell belonging to an entirely different system. For my own part—and my views are in accord with those generally taught, and are amplified in the sections on the different neoplasms—I regard the lacteal glands as the starting-point of adenoma and carcinoma, and the connective as the matricular tissue of the histoid or simple neoplasms. I by no means, however, restrict tumor formation to the continuous multiplication of the indigenous cells of the mamma, but regard the wandering cells as contributing their share in the production of the indifferent cells out of which the connective tissue growths originate and out of which the newly-formed stroma of carcinoma is produced. As will be pointed out in the section on the latter affection, I believe that the continuous proliferation and transplantation of the epithelium are quite sufficient to account for all the changes met with in the development and extension of carcinoma, without invoking the mysterious spermiatic influence of Simon, the *action de présence* of the French, or the epithelial infection of the German school—a view strongly urged by Creighton<sup>1</sup>—through which the epithelium

<sup>1</sup> *Contributions to the Physiology and Pathology of the Breast and its Lymphatic Glands*, 2d ed., 1886.



is assumed to have acquired the property of transforming all cells with which it comes in contact into a likeness to itself.

Having once started, neoplasms increase by central growth or by the progressive multiplication of their own cells, as occurs in the connective tissue series and in adenoma, or by peripheral extension along the lymphatics or the perivascular sheaths of the bloodvessels, as is witnessed in carcinoma. In the first mode the tumor remains circumscribed and encapsuled, while in the second it infiltrates and destroys the adjacent tissues and is not enclosed by a fibrous membrane. Sarcoma, however, may extend along the bloodvessels and invade the adjoining tissues without its capsule being necessarily destroyed. Hence, during their further growth and extension carcinoma and sarcoma exhibit malignant attributes, as evinced, in the former, by the continuons growth of the cells into the coverings of the mamma and the subjacent structures, and by their transportation to the associated lymphatic glands and the viscera, where they proliferate and supplant the natural tissues; and in the latter by the same phenomena, with the exception of the conversion of the lymphatic glands into secondary growths. As these features will be fully discussed in the sections on the several growths, they need not detain us here.

Although the tendency of neoplasms is to persist unchanged and increase, yet a time comes when they are subject to the same diseases as are the normal tissues. Thus they may inflame, suppurate, ulcerate, and die, and they are liable to various degenerations, transformations, and infiltrations, as the fatty, caseous, mucoid, telangiectatic, colloid, pigmentary, and calcareous, which give rise to certain subdivisions, and to which I shall again have occasion to refer when discussing the individual growths.

From a histological as well as a practical point of view it is a matter of great interest to determine whether a mammary neoplasm ever so changes its original type that one which has remained innocent for a series of years finally degenerates into one of a malignant nature or one which possesses the structure of a carcinoma or a sarcoma.

Among French writers,<sup>1</sup> Vernenil, Houel, and Desprez adduce cases to prove the transformation of so-called adenoid tumors into carcinoma. Elsässer<sup>2</sup> has described and delineated two examples of the conversion of adenoid fibroma into carcinoma; Rushton Parker<sup>3</sup> and Billroth<sup>4</sup> have met with a similar occurrence; and Klebs<sup>5</sup> states that fibrous tumors are very frequently the starting-point of cancer. I have myself

<sup>1</sup> *Bull. de la Soc. Anat.*, t. xliv. p. 285 et seq.

<sup>2</sup> *Virchow's Archiv*, Bd. lxxxii. p. 478.

<sup>3</sup> *Trans. Path. Soc. London*, vol. xxxii. p. 233.

<sup>4</sup> *Virchow's Archiv*, Bd. xviii. p. 78, and *Die Krankheiten der Brustdrüsen*, p. 52.

<sup>5</sup> *Hdbch. der Path. Anat.*, Bd. i. p. 1207.

described<sup>1</sup> a very remarkable specimen of an adenoid fibroma, which was gradually being transformed into an osteoma when the irritation of the plates of bone excited an atypical growth of the cells of the acini, through which carcinoma was engrafted on it, as shown in Fig. 15. The tumor, which was three centimeters and a half in diam-

FIG. 15.

Ossifying Adenoid Fibroma undergoing Carcinomatous Degeneration.  $\times 250$ .

eter, densely hard, almost spherical and nodular, and enclosed in a fibrous capsule, was removed from a lady seventy-four years of age by Hunter McGuire, who kindly presented it to me. The patient remains well eight years after the operation. Von Hacker<sup>2</sup> has recorded a similar case, in which a cystic adenoma formed the matrix of the carcinoma. Sir James Paget<sup>3</sup> has pointed out that not only hard mammary glandular tumors, but certain ill-defined and tough, rather than hard, indurations, may become carcinomatous. The tendency of true adenoma to pass into carcinoma, as illustrated in Fig. 16,<sup>4</sup> from Formad, is so well established that it need not be dwelt upon;<sup>5</sup> and it need scarcely

<sup>1</sup> *Medical News*, vol. i., 1883, p. 494.

<sup>2</sup> *Langenbeck's Archiv*, Bd. xxvii. p. 614.

<sup>3</sup> *St. Bartholomew's Hospital Reports*, vol. xiv. p. 65.

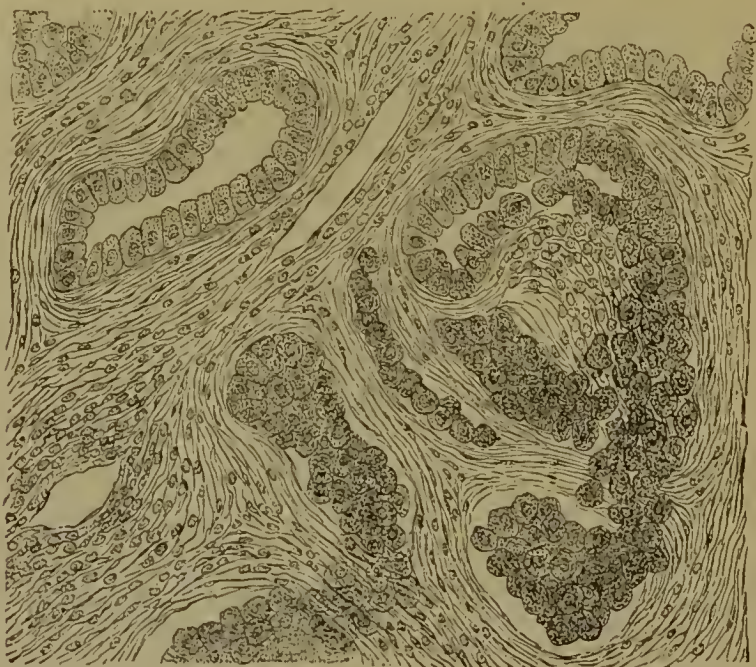
<sup>4</sup> For this illustration, and others which I have credited to him, I am indebted to Dr. H. F. Formad. They are taken from his forthcoming *Manual of Microscopic Diagnosis*.

<sup>5</sup> Among the more recent descriptions of this transformation are two cases recorded

be said that the epithelium of the acini and ducts of these and of the so-called adenoid growths, as well as of the lobular indurations, is the point of departure of the transformation.

Billroth,<sup>1</sup> Iabbé and Coyne,<sup>2</sup> Duplay,<sup>3</sup> and König<sup>4</sup> are of the opinion that the metamorphosis of fibroma into sarcoma is so frequent that primary sarcoma of the mamma is very rare; and this view would seem

FIG. 16.



Transformation of Adenoma into Carcinoma. The direct origin of the cancer cylinders from the epithelium of the ducts, through destruction of the basement membrane, is well demonstrated.  $\times 250$ .

to be verified by the fact that a tumor which has remained of the volume of a walnut for fifteen years may in three months rapidly increase to the size of a double fist,<sup>5</sup> or attain the circumference of an adult head in a few months, after having existed, not larger than an egg, for eighteen years.<sup>6</sup> In a case of my own I removed a vegetating small spindle-celled sarcoma from a lady of sixty-five. At the age of twenty-five she accidentally discovered a tumor as large as a chestnut at the inner side of the right nipple. It remained of that size until the age of by Meier in his *Inaug. Diss.*, Rostock, 1880, and the case of Lanzi, contained in *Lo Sperimentale*, March, 1882, p. 272.

<sup>1</sup> *Chir. Klinik*, Wien, 1871-76, p. 261.

<sup>2</sup> *Traité des Tumeurs Bénignes du Sein*, pp. 269, 283, and 363.

<sup>3</sup> *Traité Élément. de Path. Externe*, par Follin et Duplex, t. v. p. 628.

<sup>4</sup> *Lehrb. der Spec. Chir.*, 4te Aufl., Bd. ii. p. 89.

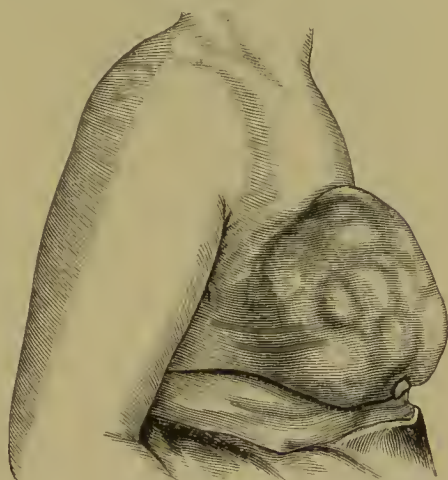
<sup>5</sup> Marignac: *Bull. de la Soc. Anat.*, t. lii. p. 428.

<sup>6</sup> Tillaux: *Thèse de Paris*, No. 494, 1880, par Cordier, p. 16.



sixty-one, when it began to grow, and during the past year had doubled its volume, so that it was larger than a foetal head. Its gross characters are shown in Fig. 17, and the breast measured seven inches more than its fellow. A recurrent nodule was removed from the pectoral muscle at the expiration of seven months. Similar cases are referred to in the section on Sarcoma. In all such instances it would appear as if a fibroma had been converted into a sarcoma through multiplication of its cells and increased vascularization, although the opponents of a change of type might urge that a sarcoma may remain latent for many years, when, without obvious cause, it begins to grow rapidly through proliferation of its cells and a proportionate decrease of its fibrous intercellular substance.

FIG. 17.



Transformation of Fibroma into Sarcoma.

Tumors of the connective tissue and of the epithelial series may coexist in one or both mammae. Thus, Richet<sup>1</sup> records an example of two fibrous growths, of twenty-two years' duration, in the lower segment, and a recent carcinoma in the upper segment of the same gland. Paget,<sup>2</sup> Rushton Parker,<sup>3</sup> and Kuester<sup>4</sup> have observed the coexistence of a single fibroma with a carcinoma in the same breast; and Waldeyer<sup>5</sup> met with a carcinoma and eight fibromata in one breast. Langhans<sup>6</sup> reports an adenoma, of nine years' growth, and a carcinoma, of six months' duration, side by side. The occurrence of fibroma and sarcoma in one breast has been recorded by Stilling<sup>7</sup> and Billroth,<sup>8</sup> and of fibroma and carcinoma by Kuester.<sup>9</sup> De Morgan,<sup>10</sup> Billroth,<sup>11</sup> and Bryant<sup>12</sup> have each seen a cystic sarcoma in one breast and a scirrhous carcinoma in its fellow, while in a case recently under my care I enucleated three fibromata from the right breast, and on total amputation of the left breast for scirrhus discovered that it also was the seat of three fibromata.

<sup>1</sup> *Le Practicien*, No. 14, 1879, p. 163.

<sup>2</sup> *Lectures on Surgical Pathology*, 3d ed., p. 565.

<sup>3</sup> *Liverpool Med.-Chir. Journ.*, No. 1, 1881, p. 212.

<sup>4</sup> *Verhand. der Deutschen Gesellschaft für Chirurgie*, Bd. xii. p. 288, Case xevi.

<sup>5</sup> *Virchow's Archiv*, Bd. lv. p. 124.

<sup>6</sup> *Ibid.*, Bd. lviii. p. 147.

<sup>7</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xv. p. 253.

<sup>8</sup> *Op. cit.*

<sup>9</sup> *Ante*, Case lxxiv.

<sup>10</sup> *Trans. Path. Soc. Lond.*, vol. xix. p. 394.

<sup>11</sup> *Chir. Klinik*, Wien, 1871-76, p. 263.

<sup>12</sup> Private communication.



## THE ETIOLOGY OF NEOPLASMS OF THE BREAST.

The causes that determine the development of the new formations of the mammary gland are obscure, as will be seen in the sections on the various tumors, in which their etiology is fully considered. That they may arise from traumatism or inflammation is undoubted; but as the great majority cannot be traced to these antecedents, it is obvious that they are not necessary factors. That a mother may transmit to a daughter a peculiarity of structure of the component tissues of the breast which predisposes it to the occurrence of new growths cannot be denied. Beyond these statements we are utterly in the dark. Cohnheim's hypothesis of tumor development from persistent embryonic tissue is not only improbable, but has not been demonstrated. We know nothing whatever of the factors that excite the active growth of cells which constitutes the essential precursor of the outbreak of tumors. I am myself of the opinion that their development is connected with, or regulated by, the changed relations of the component tissues of the breast at different periods of life, and that the condition of the tissues is, as a rule, indicated by the age of the subject.

The noncarcinomatous growths occur, on an average, at the thirty-seventh year; only 41.21 per cent. develop after the age of forty, or when the physiological life of the mamma is beginning to be impaired;<sup>1</sup> 13.62 per cent. appear before the twentieth year, and 4 per cent. are met with before the establishment of menstruation. Previously to the age of forty, or during the period of the structural perfection of the gland, or when the proportion existing between the epithelial and connective tissue constituents is normal, fibromata and sarcomata are the most common of the neoplasms; or, if the epithelium be disturbed or excited, it reacts more in accordance with its physiological evolution, and adenoma results. When carcinoma occurs between the third and fourth decades, it signifies that the breast is prematurely old.<sup>2</sup>

The carcinomatous tumors develop, on an average, at the forty-eighth year; 81.20 per cent. appear after the age of forty; and they are never met with before the twentieth year. With advancing age the connective tissue stroma of the mamma preponderates, and, as it contracts, the lacteal glands, for the most part, atrophy and disappear through absorption of their cells, which have undergone fatty degeneration. If, however, instead of passing through these normal obsolescent pro-

<sup>1</sup> Although it is, if I do not mistake, customary to regard the mamma as being perfect up to the age of forty-five, when, on an average, the catamenial function ceases, I am of the opinion that the secreting structure begins to waste at forty, and that the stage of decline occurs several years earlier in feeble women.

<sup>2</sup> Atrophy of the lacteal glands now and then shows itself in early life through their failure to develop during pregnancy and through the absence of milk after parturition.

cesses, the contracting fibrous tissue produces irritative changes in the epithelial cells, the latter increase actively and abnormally, and lay the foundation of carcinoma. At this same period the fatty constituents of the connective are excessive, and, as Virchow has shown the parallelism between adipose and mucous tissues, if the fatty elements react instead of the epithelial, they revert to their original mucoid state, and a myxoma is developed.

It will thus be seen that age, or rather the anatomical arrangement of the stromal and epithelial constituents as indicated by the age, does exercise a most marked influence upon the kind of neoplasm to which the mamma is most liable. Arranging the cases upon which this section is based in accordance with the functional activity and physiological life of the mamma, there appeared—

	Fibroma.	Sarcoma.	Myxoma.	Adenoma.	Carcinoma.
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
During the developmental period . . . . .	7, or 7.29	4, or 2.70			
During the period of greatest activity . . . . .	67, or 69.79	67, or 45.27	3, or 25	16, or 69.56	305, or 18.80
During the period of functional decline. . . . .	22, or 22.91	77, or 52.02	9, or 75	7, or 30.44	1317, or 81.20
	96	148	12	23	1622

From these facts it is evident that the only tumors that develop before the sixteenth year are fibromata and sarcomata. It is further quite clear that between the sixteenth and fortieth years they are most common in the following order: fibroma, adenoma, sarcoma, myxoma, and carcinoma, and that after the age of forty the order is reversed, being carcinoma, myxoma, sarcoma, adenoma, and fibroma. In other words, structural perfection of the mamma renders it most obnoxious to fibroma, adenoma, and sarcoma, while atrophy or decay predisposes it to carcinoma and myxoma.

## THE ANATOMY OF THE CONNECTIVE TISSUE NEOPLASMS.

The connective tissue neoplasms possess certain features in common which I shall consider, with the view of avoiding needless repetition, before discussing the individual growths of this series. Apart from the facts that they are usually round or ovoid, bossed, lobulated, or nodular on their surface, and invested by a fibrous capsule which separates them from the remainder of the gland, but with the latter of which they are frequently more or less closely connected, their coarse appearance on section indicates that they may be solid or cystic, the latter including the vegetating forms. Of the 270 cases that I have

studied, 148, or 54.81 per cent., were solid, and 122, or 45.18 per cent., were cystic, and, as a rule, vegetating or proliferous. Among themselves, however, they evince differences in their macroscopic features, since 63 per cent. of the fibromata are solid, and 37 per cent. are vegetating; 50 per cent. of the sarcomata are solid, and 50 per cent. are cystic; while 50 per cent. of the myxomata are solid, and 50 per cent. are vegetating. The cut surfaces of the solid tumors are smooth and unbroken. The cystic and vegetating forms, on the other hand, are pervaded by fissures, clefts, fluid cysts, or cysts containing solid growths; but as the cysts, whether they be barren, fluid, or solid, arise primarily in the same way, and as the clinical features of the cystic and vegetating varieties are essentially the same, I will, to avoid confusion, speak of solid and cystic tumors, including under the latter term the cystic and vegetating, as the vegetations merely represent a further stage of development of the solid growths.

The solid connective tissue neoplasms, which constitute nearly 55 per cent. of the entire number, correspond, for the most part, to the noneystic adenocoeles, adenomata, and mammary glandular tumors, and to those to which some authors prefix the term adeno, as minute examination discloses that the majority contain the remains of glandular elements, as is shown in Figs. 204, 205, and 209. These may be entirely normal, or the epithelium may have sustained changes in form and arrangement, or the acini may be dilated, or they may be undergoing obliteration, or, as I have witnessed in several examples, they disappear altogether. In addition to these features, there are very few specimens which do not contain enlarged and deformed ducts, which are the microscopic representatives of the irregular fissures, slits, or cysts that exist macroscopically in the cystic tumors. In one example out of every seven or eight they are, moreover, occupied by cystoid cavities, which are due either to fatty or myxomatous degeneration of their cellular elements or to fatty and mucoid changes of the irritated epithelium of the acini and ducts. In the former events the contents of the spaces, which have no epithelial lining, are yellowish, greenish, sanguinolent, or bloody, while in the latter they are serous, mucoid, or even pultaceous. Whether their origin be glandular or periglandular, they represent retrograde metamorphoses, and, although they may coexist, they must not be confounded with the true cysts of the second type of tumor, which represent a further stage of evolution and arise in an entirely different way.

The cystic connective tissue neoplasms, which embrace 45 per cent. of all cases, and which were formerly described as, or included under, the carcinoma hydatides of Sir Charles Bell, the vesicular scirrhus of Benedict, the hydatid or encysted tumor of Sir Astley Cooper, the tubercous cystic tumor of Cæsar Hawkins, the cystosarcoma simplex,

proliferum, et phyllodes of Johannes Müller, the serocystic tumor of Sir Benjamin Brodie, the proliferous mammary cysts and mammary glandular tumors of Sir James Paget, the cystoid adenocoeles or adenomas of Birkett, the cystoide and papilläre drüsengeschwülste of Foerster, and the true cystic adenocoeles of Bryant, are now termed, in accordance with the constitution of their stroma, cystic fibromata, cystic sarcomata, and cystic myxomata. When the cysts are barren of vegetations, the tumors are simply cystic or pericanalicular; whereas if the dilated ducts are filled more or less completely by intracystic growths, they are variously known as vegetating, arborescent, papillary, proliferous, endocanalicular, or intracanalicular tumors, and constitute 86 per cent. of all the cystic neoplasms of the mamma.

As was first demonstrated by Brodie and confirmed by Reinhardt, the cysts are due to ectasia of the lactiferous ducts, which are very apparent, even on the cut surfaces of growths not larger than a pullet's

FIG. 18.



Cystic Fibroma,<sup>1</sup> showing transverse and longitudinal sections of dilated and elongated ducts, to the undermost one of which acini are attached, lined by columnar epithelium.  $\times 80$ .

egg, as variously branched, tortuous, or intercommunicating fissures, slits, or clefts. In smaller growths, of the size, for example, of an almond, the initial steps of the change can be followed with the

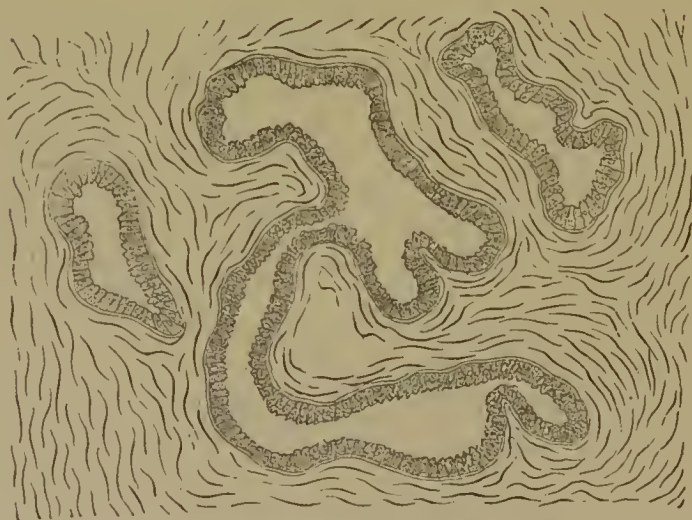
<sup>1</sup> From a section of a fibroma of two years' duration which I enucleated from the upper and outer quadrant of the left mamma of a single woman twenty-two years of age.



microscope, which shows conclusively, as is represented in Fig. 18, that these fissures are nothing more than the ducts, and sometimes the acini, the walls of which have been mechanically disparted or drawn asunder by the eccentric growth of the peritubular and periacinous tissue of the neoplasm. In some specimens, even of large dimensions, when, in addition to enlargement of the ducts, there is progressive new growth of their membrana propria, the fissures are so stretched that they persist as such, their inner surfaces being merely moistened by a slight amount of clear viscid fluid. In others, again, through the accumulation of their contents, they assume the form of rounded or elongated and wide cavities, and may even contain as much as a quart of serous, mucous, lactescent, or sanguinolent fluid. In the majority of examples, however, the interstitial or pericanalicular tissue grows or projects into the deformed ducts as variously-shaped masses, as the papillary, clavate, dendritic, cauliflower, spheroidal, lobulated, or pedunculated, with broad or constricted bases. They are covered by glandular epithelium, which is usually round or euboid, but may be distinctly columnar, and they may either lie loosely in the cysts or fill them entirely. These appearances are quite visible to the unaided eye, even in small tumors, or if they are apparently absent, they can be detected on minute examination, as is shown in Fig. 19, from Labbé and Coyne.

The microscopic features are coarsely followed in the larger neoplasms,

FIG. 19.



Cystic Fibroma, showing dilated ducts, the largest of which is occupied by incipient vegetations.  $\times 70$ .

so that the intracanalicular projections are very evident to the naked eye, as in Fig. 20, from the Gross Museum. In other specimens, as in

Fig. 21, from the Gross Museum, they constitute pedunculated growths, which look not unlike miniature bunches of grapes, while in others section of the growth looks like that of a cabbage, as in Fig. 22, from Perls.

In their histological construction the intracystic growths do not differ from the remainder of the tumor, and, like it, they are liable to various transformations, as the telangiectatic, fatty, and myxomatous. Apart from softening cysts, they may themselves give rise to secondary cystic conditions, which serve to impress one with the idea that they contain glandular tissue. These cysts, which are in reality follicular or space cysts, or modified retention cysts, result from the compression and fusion of the surfaces of contiguous papillary vegetations at one or more points, so that the interpapillary spaces are converted into recesses or follicles, the epithelial lining of which secretes a mucous fluid.

Independently of these pseudotubular glands, the more tuberous vegetations now and then include preëxisting glandular structure,

FIG. 20.



Intracanalicular Fibroma, exhibiting its lobulated arrangement and two dilated ducts containing tuberous growths laid open.

FIG. 21.



Intracanalicular Fibroma, showing lobulated masses dependent from long and narrow pedicles.

which is not only definable by the microscope, but is indicated by the dilated ducts which traverse them.

In addition to the solid ingrowths, the dilated ducts usually contain fluid of a mucoid nature, which may be bloody if the vegetations are very vascular. In quantity it may be scarcely more abundant than to

moisten the parts, or it may amount to many ounces and serve to increase the lobulated or nodular outline of the neoplasms of which it

FIG. 22.



Intracanalicular Fibroma, showing the ducts packed with vegetations, sections of which resemble the cut surfaces of a cabbage.

forms a part. Now and then it is discharged by the nipple, but rarely in large quantities.

The connective tissue neoplasms may be diffused or involve the entire mamma, as happens particularly in fibromata, when they constitute the affection called elephantiasis of the breast by Virchow, or, as it is usually known, general hypertrophy; or the morbid process may be, and generally is, restricted to a single lobule or to several adjacent lobules, when they are denominated tuberos, lobular, or circumscribed. The latter are invested with a capsule of new formation, which serves to distinguish them from the carcinomatous tumors, and which admits of their being moved about in all directions, although in many instances their deep surface is attached to the gland by a more or less broad pedicle, in which vessels or glandular tissue, or even cysts, can be detected. This is especially true of the fibromata and small sarcomata, so that, as I have not infrequently witnessed, a portion of the breast has to be removed along with the tumor. In such cases, if it happens that an operation be conducted during lactation, milk may be found in the imbedded lobules, as in an example of adenoid sarcoma recorded by Billroth;<sup>1</sup> or that fluid may be discharged by the wound, as in two instances of fibroma from the practice of Cras<sup>2</sup> and Cruveilhier,<sup>3</sup> and in one of recurrent spindle-celled sarcoma reported by Le Fort.<sup>4</sup>

<sup>1</sup> *Virchow's Archiv*, Bd. xviii. p. 68.

<sup>2</sup> *Bull. et Mém. de la Soc. de Chir.*, vol. iii. p. 13.

<sup>3</sup> *Ibid.*, p. 153.

<sup>4</sup> *Ibid.*, vol. ii. p. 487.



In the circumscribed or lobular neoplasms the remainder of the gland is, when the growth is voluminous, pushed aside, flattened, spread out, or even atrophied, although it now and then happens in sarcoma and myxoma that it is invaded by the rapidly proliferating tissue. It is also not very uncommon for the investing capsule and overlying tissues to give way and permit a portion of the mass to protrude externally.

### FIBROMA.

Neoplasms composed of hyperplastic connective tissue, in which normal or variously altered preëxisting acini and ducts are sparingly interspersed, are classified as fibromata. From the persistence mainly of the acini, they are included by Birkett in his first group of adenomata or adenosarcomata, which he describes as being "compact, dense, firm, fibrous, lobulated, and invested by their own fibrous capsule;" and they are synonymous with the solid fibroid glandular tumors of Foerster, the adenomata with predominance of stroma of Broca, the corps fibreux of Cruveilhier, the chronic mammary tumors of Sir Astley Cooper, the pancreatic sarcomata of Abernethy, the adenoid tumors of Velpeau, the partial hypertrophies of Lebert, and the adenoeccles of Bryant. That they form at least a part of the mammary glandular tumors of Paget is evident from the statement that the connective tissue was very abundant in most of the specimens he had examined. From the very frequent presence of preëxisting lacteal glands in their midst, Green, Duplay, Billroth, Eriksen, and Beck term them adenofibromata. Klebs and Ziegler recognize an almost pure fibroma and an adenofibroma; while Virchow, Rosenstirn, Monod, Cornil and Ranvier, Lannelongue, Tripier, Labbé and Coyne, Perls, and other modern investigators describe them merely as fibromata. The proliferous or vegetating variety, properly denominated cystic fibroma, is equivalent to the papilläre drüsengeschwülste of Foerster, the cystosarcoma fibrosum of Rindfleisch, the fibroma intracanalicular of Virchow, the fibroma endocanalicular of Labbé and Coyne, the cystoid adenoma of Birkett, the true cystic adenoeccle of Bryant, the proliferous mammary cyst of Paget, the hydatid or encysted tumor of Sir Astley Cooper, and the tuberous cystic tumor of Caesar Hawkins.

Fibromata are circumscribed, spherical, rounded, or ovoid, and have a nodular, bossed, or lobulated outline. Their consistence is usually firm and elastic, or hard when they are not succulent, or unequal when the fluid contents of the cysts are in excess, in which event they are elastic or soft and fluctuating over the more prominent bosses, but firm elsewhere. On section they may be dry, white,aceous, or opaque-white, dense, and compact, and cry under the knife, and the interlacing bundles of fibrous tissue may be arranged concentrically around centres



which project above the level of the cut surfaces. Minute examination of growths which present these peculiarities shows that they are composed of dense bundles of mature fibrous tissue, which is almost or entirely devoid of corpuscles, and that the small projections correspond to ducts and acini. This type corresponds, therefore, to the neoplasms formerly called fibroid or desmoid. In other specimens, as in Fig. 23, from Formad, bands of wavy connective tissue interlace in every

FIG. 23.



**Fibroma.** The newly-formed fibrillar connective tissue is loose and wavy, and transverse cuts of bundles of fibres are seen at many points. In the upper portion of the drawing is a duct in transverse section, the epithelium of which has undergone irritative hyperplasia.  $\times 300$ .

direction. Such tumors are more or less juicy or moist, and of a glistening whitish, grayish-white, or rosaceous tint, and represent the majority of fibromata. In rapidly-growing examples the minute structure is that of recent connective tissue abounding in cellular elements.

The smallest vegetating tumors have a lobed appearance, while the macroscopic features of the larger ones vary in accordance with the transformations to which they are liable. Thus, while the mass of the growth may be firm and of a milk-white color, the vegetations are not infrequently softer and more transparent. When they are very vascular, their tint is rosaceous, or decidedly red, or red in lines, or even ecchymotic. A yellowish hue is indicative of fatty changes, while myxomatous degeneration is characterized by areas of gelatinous appearance.

Inflammation and suppuration of fibroma are very uncommon, and fungous protrusion was met with in only five of the one hundred cases which I have collated. It is interesting to note, from a diagnostic standpoint, that these were all examples of vegetating growths, and that the skin around the ulcer was normal as respects freedom from infiltration and adhesion to the protruding mass.

In a unique case recorded by Satterthwaite,<sup>1</sup> a proliferous fibroma protruded through the dilated orifices of the milk ducts without the intervention of ulceration, so that the nipple was surrounded by a mass of tissue which was eight lines high and looked like exuberant granulations.

The degenerations and transformations of fibromata are the cystoid, fatty, myxomatous, osseous, calcareous, and telangiectatic; but they are infrequent. In about 3 per cent. of all examples they are the seat of cysts, due either to fatty or mucoid transformation of the epithelium of the acini or to myxomatous change of the connective tissue. In addition to the latter, there may also be fatty metamorphosis, and in this event the growth may contain blood or extravasation cysts. In 4 per cent. of all cases, provided they are of many years' duration, the mineral salts are interspersed throughout limited portions of the mass, so as to impart to it the appearance of spongy bone; or they are aggregated into a densely hard concretion, which, as recorded by Cruveilhier,<sup>2</sup> may resemble in size and configuration the head of the femur; or, as in the case of Monteils,<sup>3</sup> they may form plates surrounding the fibrous tissue, some of which contain osteoblasts. Ossification is very uncommon, the only example of that occurrence of which I have any knowledge being one of a true spongy osteoma, as large as a pigeon's egg, contained in a cystic myxomatous fibroma removed by Leloir.<sup>4</sup>

Although they are, as a rule, only moderately vascular, fibromata undergo telangiectatic transformation in 6 per cent. of all instances, which is usually associated with rapid growth, and is indicated in one half of the examples by a bloody discharge from the nipple. In these cases of increased vascularity, which, as well as the calcareous degeneration, appears to be confined to the cystic fibromata, the vegetations are pervaded by large vessels, to the rupture of which may be ascribed the more or less transformed blood that is found in the dilated ducts and the hemorrhages which occur when they protrude externally.

Fibrous tumors of the mamma are usually solitary. Thus, of 100 examples, which include 24 of my own, only 15 were multiple, two growths being present in one breast in 5, one in both breasts in 5, two in both breasts in 4, and three in both breasts in 1. In the last case,

<sup>1</sup> *The Medical Record*, 1874, p. 635.

<sup>2</sup> *Bull. de la Soc. Anat.*, t. xlviii. p. 344.

<sup>3</sup> *Bull. de la Soc. de Chir.*, sér. 3, t. i. p. 472.

<sup>4</sup> *Gaz. Méd. de Paris*, No. 52, 1878.

which was under my care in March, 1887, I enucleated three fibromata from the right breast which had existed, respectively, for twenty-four, five, and two years, and, after amputating the left mamma for carcinoma, discovered that, in addition to the malignant growth, it contained three small fibromata. The patient, who was fifty-one years of age, single, and still menstruated regularly, continues well.

When single they are, for the most part, peripheral, their favorite locality being the upper and outer portion of the left breast. Thus, of 85 cases in which the seat is noticed the tumor occupied—

The upper hemisphere in . . . . .	14	The upper and outer quadrant in . . .	10
The lower " in . . . . .	9	The lower and " " in . . .	4
The outer " in . . . . .	10	The upper and inner " in . . .	8
The inner " in . . . . .	9	The lower and " " in . . .	5
		The vicinity of the nipple and areola in	16

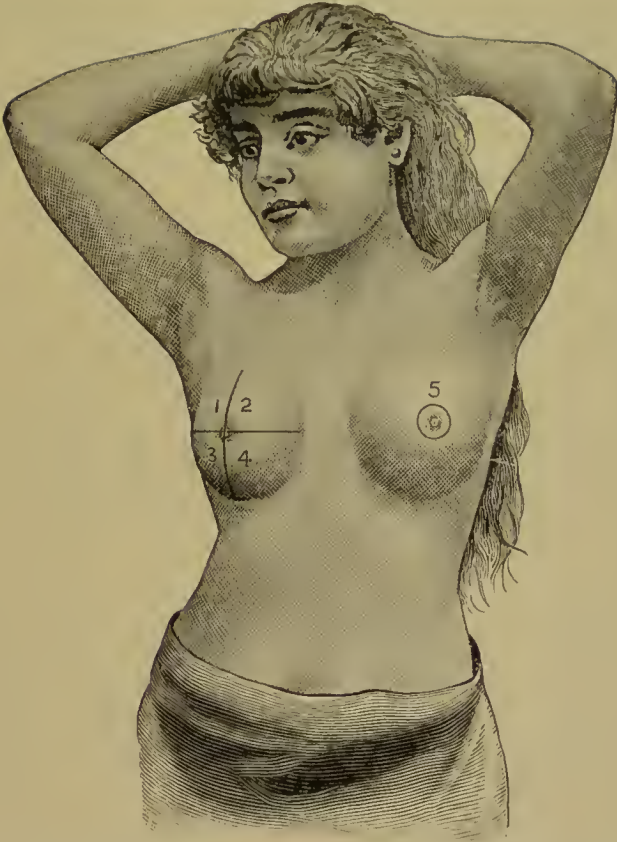
These regions are shown in Figs. 24 and 25.

FIG. 24.



1. Upper hemisphere. 2. Lower hemisphere. 3. Outer hemisphere. 4. Inner hemisphere.

FIG. 25.



1. Upper and outer quadrant. 2. Upper and inner quadrant. 3. Lower and outer quadrant.  
4. Lower and inner quadrant. 5. Region of the nipple and areola.

Fibromata are generally quite superficial, and in rare cases, or once in every twenty-five, project beyond the level of the skin as pendulous or pedunculated growths.

They are met with as early as the seventh and as late as the seventy-fourth year, the average age of their first observation being 29.1 years, but they are uncommon before puberty and after the fifth decade. Of the 96 cases in which the age is noted—

19 appeared between 10 and 19 years.	5 appeared between 50 and 59 years.
36 " " 20 " 29 "	1 " " 60 " 69 "
18 " " 30 " 39 "	1 " at 7 years.
15 " " 40 " 49 "	1 " at 74 years.

Of the entire number, 7, or 7.29 per cent., occurred before the sixteenth year—namely, at the ages of seven, twelve, thirteen, fourteen, fourteen, fourteen, and fifteen, or during the developmental state of the mamma; 67, or 69.79 per cent., appeared between the sixteenth and fortieth years, or at a period when the breast and the



genital organs are functionally most active; and 22, 22.91 per cent., after the fortieth year, or during the period of their functional decline. It is, moreover, interesting to note that cystic fibroma develops later in life than the solid variety, since the average age at which the former was first noticed was 38.42 years, against 25.54 years for the latter. Hence it may be said that nonvegetating fibromata, which represent 63.54 per cent. of the entire number, are essentially outgrowths of the young and active mamma, while vegetating fibromata are outgrowths of the mature gland.

In the unique case of fibroma in childhood recorded by Dr. Hopkins<sup>1</sup> of Brooklyn a tumor as large as a chestnut was enucleated from the right mamma of a girl seven years of age. At the end of six months a small growth was noticed in the left breast, and two years later it had attained a diameter of one inch. At the expiration of five months the entire breast, with four large axillary glands, was removed. Sections of the growth examined by myself developed that it was made up of wavy fibrous tissue, in which were intercalated a few ducts.

Of the patients, 39 were single when the tumor was first observed, and 36 were married, while the social condition is not stated in the remainder. Of the married women, 20 had more than one, and 7 had one child, but 4 of these had never suckled; 6 were barren; and the question of children is not mentioned in 3. In 2 the disease developed during lactation.

Of 55 cases in which the menstrual function is recorded, 49 were regular, 5 were irregular, and 1 was the subject of metrorrhagia. 2 of the patients after the fiftieth year were menstruating, while of the young subjects it is certain that the catamenia had appeared in 1 at the age of fourteen. Assuming, in the remaining 6, and in 5 women after fifty years, that the menses had either not appeared or had ceased, it is evident that fibromata are developed principally during the menstrual epoch of life. These facts, when considered in connection with the statements concerning the social condition of the patients, demonstrate conclusively that neither celibacy nor disordered nor arrested menstruation is an important agent in their production.

In only 14 instances, or in about one in every seven, was the tumor traceable to injury. In 1 there was antecedent mastitis; in 2 the mothers of the patients died of mammary cancer; while in 1 it appeared to be transmitted from patient to child. In the last case, recorded by Pnls,<sup>2</sup> the left breast of the mother was the seat of two vegetating fibromata, while two cystic tumors were present in the left breast of the daughter. The general health of the patients was, as a rule, excellent.

<sup>1</sup> *Boston Med. and Surg. Journal*, March 26, 1885, p. 290.

<sup>2</sup> *Virchow's Archiv*, Bd. xciv. p. 455.

The growth of fibromata is slower than that of the other connective tissue tumors, but it is very variable, and seems to be influenced by the presence or absence of vegetations. Of the solid variety, the smallest that I have met with attained a diameter of half an inch and a thickness of three-eighths of an inch in twelve months, and my experience shows that they rarely exceed the volume of a large walnut in three years. Even at the end of ten years they may be limited to that size,<sup>1</sup> or measure only three inches in diameter in eighteen years.<sup>2</sup> A breadth of an inch and three-quarters in six months is the most rapid growth that I have witnessed. The largest examples that I find recorded were of the size of a goose's egg in four years,<sup>3</sup> or of an adult hand and weighed three pounds and a half in five years,<sup>4</sup> or measured nearly twelve inches in length and weighed seven pounds in twelve years;<sup>5</sup> or had a circumference of twenty-two inches and weighed four pounds in twenty years;<sup>6</sup> or attained the volume of two fists and weighed upward of twelve pounds in twenty-one years.<sup>7</sup> On the whole, the rate of their growth may be computed at about two-thirds of an inch a year.

Cystic fibromata increase more quickly and acquire a larger size, as a rule, than the preceding variety. While it is true that they may require twelve months to reach the volume of a small chestnut,<sup>8</sup> or six months,<sup>9</sup> eighteen months,<sup>9</sup> two,<sup>9</sup> three,<sup>9</sup> and even four years<sup>9</sup> to attain the dimensions of a hen's egg, they grow, on the other hand, to the size of a double fist or foetal head in two years and a half<sup>10</sup> or six years,<sup>11</sup> of an adult head in one year,<sup>12</sup> eight years,<sup>13</sup> or twenty-five years,<sup>14</sup> or have a circumference of twenty-nine inches and weigh eight pounds in six years,<sup>15</sup> or weigh twenty-nine pounds in seven years.<sup>16</sup> A peculiarity of their growth is that, while they may have been stationary or have progressed slowly for a long time, they suddenly, and without obvious cause, begin to increase rapidly, so that a nodule that has remained of the size of a walnut for five years and a half reaches the volume of a double fist in six months,<sup>17</sup> or a tumor which has taken twenty-four years to equal the size of an orange attains that of an adult head and

<sup>1</sup> Labbé et Coyne: *op. cit.*, p. 388.

<sup>2</sup> Muriel: *Trans. Path. Soc. London*, vol. viii. p. 384.

<sup>3</sup> Schuh: *Chirurgie und Operationslehre*, p. 311.

<sup>4</sup> Bull: *Illus. Quart. of Med. and Surg.*, vol. i. No. 4, p. 83.

<sup>5</sup> Paget: *op. cit.*, p. 564. <sup>6</sup> Monteils: *Bull. de la Soc. de Chir.*, 3 sér., t. i. p. 472.

<sup>7</sup> Cras: *Bull. et Mém. de la Soc. de Chir.*, t. iii. p. 13.

<sup>8</sup> Labbé et Coyne: *op. cit.*, p. 397. <sup>9</sup> *Ibid.*, pp. 448, 190, 131, 408, and 264.

<sup>10</sup> Demarquay: *Bull. de la Soc. Anat.*, t. xlii. p. 492, Paris, 1868.

<sup>11</sup> Labbé et Coyne: *op. cit.*, p. 259. <sup>12</sup> Lebreton: *Bull. Soc. Anat.*, t. xliii. p. 282.

<sup>13</sup> Heineke: *Beiträg zur Statistik der Mammatumoren*, p. 2.

<sup>14</sup> Labbé et Coyne: *op. cit.*, p. 270.

<sup>15</sup> De Morgan: *Trans. Path. Soc. Lond.*, vol. xxi. p. 352.

<sup>16</sup> Gherini: *Annali Univ. di Med.*, Feb., 1878. <sup>17</sup> Labbé et Coyne: *op. cit.*, p. 259.

weighs nearly six pounds in an additional year.<sup>1</sup> Under these circumstances the neoplasm will be found to be very vascular, or contain blood cysts or a large quantity of fluid. Hence the mode of increase is of importance as an aid in the diagnosis of the variety of fibroma, a slowly and regularly growing tumor indicating freedom from cysts and vegetations, and a suddenly and rapidly increasing tumor, with decided enlargement of its bosses, indicating the accumulation of fluid contents and intracanalicular vegetations.

It now and then happens that fibromata grow very rapidly during pregnancy, as in the case reported by Cras, while in about 4 per cent. of all examples they become larger and softer during the menstrual discharge and subside at its termination, and in 1 per cent. they become smaller and softer. In one case the tumor became harder and fuller just before the appearance of the menses, but returned to its former consistence and volume when the flow was established. In an instance recorded by Fergusson<sup>2</sup> it increased very rapidly after the menopause; while in a unique example reported by De Morgan<sup>3</sup> the breast suddenly doubled its size during a severe attack of gout in the toe, but returned to its original dimensions with the disappearance of the disease.

Throughout the entire life of fibroma, the skin, as a rule, remains mobile and normal in texture and color; the subcutaneous veins are not enlarged; the nipple is natural; the neighboring lymphatic glands are not enlarged; and the tumor is free from superficial or deep attachments.

To these general statements there are some exceptions. In three cases the skin was adherent, but to a limited extent only in two; in four it was red, and in one of these, at points, almost purple; while in five, as has been already mentioned, it ulcerated. The superficial veins were tortuous and dilated in five. The nipple was depressed in three. In two the neoplasm was so closely connected with the pectoral muscle that some of its fibres had to be removed with it; while in another it adhered firmly, by two prolongations, to the periosteum of the sternum. In two instances the lymphatic glands were enlarged.

In one case out of every seven of cystic fibromata there is a discharge from the nipple, but this symptom does not appear to be present in the solid form of fibrous tumor. In an example recorded by Labbé<sup>4</sup> a spontaneous, although scanty, escape of a whitish fluid preceded the detection of the new growth by two months, when it became bloody. In a patient under the care of Guyon<sup>5</sup> a sanguinolent discharge was induced by the pressure upon the breast, but it had ceased for several years before the tumor was extirpated. In a third case<sup>6</sup> there were several hemorrhages by the nipple during the rapid increase of the tumor or during the last month of its existence. In a case of

<sup>1</sup> Labbé et Coyne: *op. cit.*, p. 270.

<sup>2</sup> *Trans. Path. Soc. London*, vol. iv. p. 353.

<sup>3</sup> *Ante.*

<sup>4</sup> *Op. cit.*, p. 397.

<sup>5</sup> *Ibid.*, p. 206.

<sup>6</sup> Lebreton: *ante.*

my own a yellowish-brown fluid could be expressed, while in that of Watson<sup>1</sup> the discharge was spontaneous. In all of these examples the cysts were more or less completely filled with highly vascular vegetations, so that a bloody discharge is indicative of that condition.

In 35 examples of fibroma pain was experienced. Attention was, however, first called to the affection by suffering in only 3 of the entire number, while in the remainder it declared itself after the discovery of the tumor. In 20, or more than one-half, the pain was of an intermittent, severe shooting, darting, lancinating, or neuralgic character, while in 15 it was slight and evanescent, usually darting, but not infrequently dull and aching. In 9 it did not appear until the tumor began to increase rapidly; in 4 it was experienced only at the menstrual period; in 2 it grew worse at that time, and in 1 during lactation; while in 1 the pain was aggravated after the cessation of the catamenia. In the examples of ulceration of the skin and fungous protrusion the suffering was slight; in one, indeed, there was no pain at all, but the mass was exquisitely tender on handling. Including this case, only six were sensitive. In one of my own, a tumor not larger than a bean was, for the last three months of its existence, as intolerant of manipulation as a painful subcutaneous tubercle. It had existed for one year in the right mamma of a prolific female, aged forty-two, from whose left breast a similar growth was removed six years previously in Saxe-Weimar. In three examples the pain was neuralgic, paroxysmal, and severe, and radiated to the shoulder, base of the neck, axilla, and inner side of the arm. Not only were the tumors tender to the touch, but the mere friction of the clothing provoked suffering; while in one the patient was deprived of sleep, appetite, and the use of the corresponding arm. In none of these so-called *irritable tumors of the breast* did the growth exceed the volume of a small walnut. Hence, while it is true that amyelinic neuromata occur in the mamma, as has been demonstrated by Tripier<sup>2</sup> in two instances, it is highly probable that the small growths which excite so much suffering are composed essentially of indurated fibrous tissue comprising nerve filaments.

Recurrence of fibromata is met with once in every twenty-five cases. The most remarkable of these is that recorded by Rosenstirn,<sup>3</sup> in which a tumor of one year's standing, and seated in the left mamma of a prolific woman of forty-five, was enucleated in April, 1855. In March, 1860, a growth of six months' duration was removed from the right breast. Four additional tumors were extirpated from the left mamma in March, 1861, August, 1862, August, 1866, and September, 1869,

<sup>1</sup> *Trans. Path. Soc. London*, vol. xix. p. 386.

<sup>2</sup> *Dict. Encyclop. des Sciences médicales*, sér. 2, t. iv. p. 408.

<sup>3</sup> *Virchow's Archiv*, Bd. lvii. p. 166.



and two from the right breast in 1862 and 1869. They were all traversed by enlarged and deformed ducts. These illustrations of recurrence do not denote local malignity, but merely indicate that in some women there is a tendency to the formation of multiple fibrous growths, so that in these cases it was a question either of the further development of a nodule which was overlooked at the time of operation, or of the successive appearance of similar tumors in portions of the gland that remained behind. In all of these examples the growths were simply enucleated; but even when the gland has apparently been entirely removed it need not excite surprise if fibromata subsequently make their appearance, since outstanding lobules are sometimes disseminated throughout the entire mammary region, and even in the axilla, and may readily escape the eye of the surgeon.

Other evidences of the innocent nature of fibromata are the absence of enlargement of the associated lymphatic glands and of secondary deposits in the viscera. Their benignity was, moreover, demonstrated by the facts that they had existed, on an average, for five years and eight months before they were subjected to the knife, and that the total duration of life from their first observation to the date of the final reports averaged fourteen years.

Although they are not malignant, fibromata may, in their open and fungating state, prove destructive to life through profuse suppuration and hemorrhage, or through the injurious effects exerted upon neighboring organs. Thus, Foerster<sup>1</sup> describes a solid tumor, eleven inches long, eight broad, and four inches and a half in thickness, which produced absorption of a portion of the seventh rib, and penetrated the thorax, where, covered by the pleura, it formed a mass seven inches long, five broad, and three inches and a half thick, which rested upon the diaphragm, pushed the lung upward and completely compressed its lower lobe, dislocated the heart to the right, and curved the vertebral column to the opposite side.

The diagnosis of fibromata is based upon their indolent and insidious origin, their great mobility, peripheral situation, firm consistence, nodular or lobulated outline, slow growth, moderate dimensions for the period of their existence, freedom from alterations in the skin, nipple, subcutaneous veins, and lymphatic glands, slight liability to ulcerate and fungate and to a discharge from the nipple, slight tendency to be painful during their progress, and upon their greatest frequency between the sixteenth and fortieth years, or, on an average, at the twenty-ninth year.

The only tumors that exist prior to the sixteenth year are fibroma and sarcoma, the former being more than twice as common as the latter. The fibromata are always solid, while the sarcomata are cystic

<sup>1</sup> *Op. cit.*, Bd. ii. p. 481.

in three-fourths and medullary in one-fourth of all examples, so that a firm, solid neoplasm at that period of life is a fibroma and nothing else.

The distinction between the solid and cystic varieties may be made by attention to the following points: The former appear, on an average, at the twenty-fifth year; 11 per cent. develop before the age of sixteen, and 68 per cent. before the thirtieth year. They are uniformly firm or hard, never fungate, nor are they marked by a bloody discharge from the nipple. The latter are never seen before the sixteenth year; occur, on an average, at the thirty-fifth year; and only 40 per cent. originate before the age of thirty. Their consistence is unequal, being firm at points and soft and fluctuating at others; they are more largely and deeply lobulated, fungate once in every seven cases, and discharge by the nipple in an equal proportion of instances. Adhesion and discoloration of the skin, enlargement of the superficial veins, ulceration, depression of the nipple, and deep attachments, features which are uncommon in fibromata, if present, are characteristic of the cystic variety. Their growth is, moreover, sudden and rapid after having remained stationary or advanced slowly for several years.

The diagnosis between cystic fibroma and cystic sarcoma cannot in every case be absolutely made without a resort to the microscope, as they possess so many clinical features in common.

The treatment of fibroma is by enucleation from its capsule, the line of incision radiating from the nipple. If an involuting breast be the seat of several tumors, it should be excised, and the entire gland should be sacrificed if the growth be ulcerated. In women of fashion the scar may be hidden from view by adopting the practice of Gaillard Thomas.<sup>1</sup> When the tumor is of moderate volume, neither very small nor very large, that distinguished gynecologist makes an incision in the fold which unites the lower hemisphere of the breast to the thorax, through which that portion is dissected from its deep attachments, when an incision from the under surface of the breast admits of the removal of the growth. If the operation be aseptic, as all operations should be, and care be taken to drain the cavity left by the enucleation of the tumor, the resulting cicatrix will be scarcely apparent, especially as the greater portion of its extent will be concealed.

In recommending the removal of fibroma, I am not unmindful of the statement that it may disappear after marriage or during pregnancy or at the climacteric, but I cannot find the slightest evidence confirmatory of this assertion. Broca<sup>2</sup> regards compression as an efficacious measure, while other surgeons resort to sorbafacient plasters and unguents. These expedients I regard as not only useless, but as positively detrimental, as they may excite active growth. Nor do I favor the let-alone policy of some surgeons. As I have already pointed out,

<sup>1</sup> *New York Med. Journ.*, April, 1882, p. 337.

<sup>2</sup> *Traité des Tumeurs*, t. ii. p. 462.

fibroma is liable to be transformed into sarcoma and carcinoma; and the cystic variety, if not removed in time, not uncommonly ulcerates, and protrudes large fungous, offensive, and bleeding masses. Then, too, a tumor of the breast, no matter what its nature may be, is always a source of anxiety. It is for these reasons that I advise an early operation, as it is the only means which will rid the patient of these risks and annoyances.

### SARCOMA.

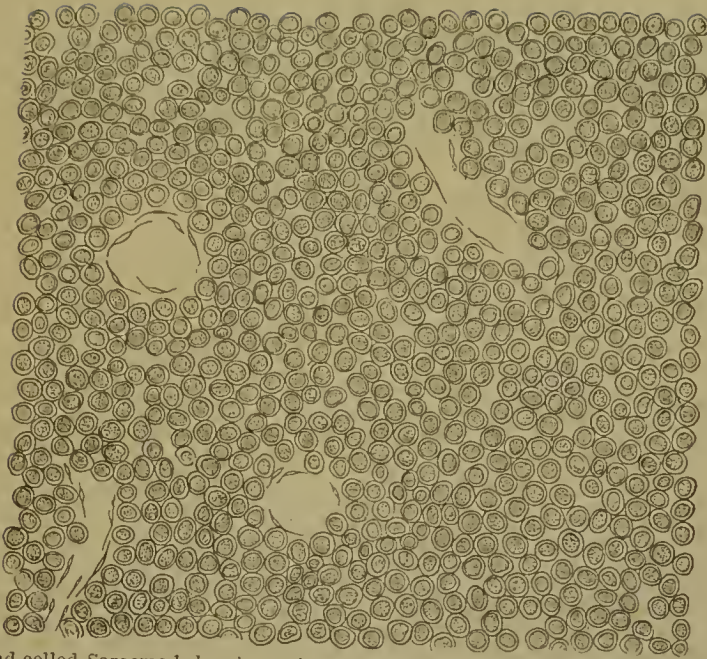
The term sarcoma has no histological significance, having been employed by Abernethy to designate a tumor "having a firm and fleshy feel;" but it is now used to indicate a new formation which has its physiological type in embryonic tissue and is composed of the undeveloped cells of the connective tissue series, separated by intercellular substance. From the excessive preponderance and grouping of the cells which endow it with its peculiar characters, and from their indisposition to develop into higher tissues, they constitute a structure which is unlike any mature tissue, and may therefore be regarded as an atypical connective tissue production, just as carcinoma is an atypical epithelial growth.

The histogenesis of sarcoma is very simple. In consequence of the irritation to which they are subjected, the fixed cells of the connective tissue stroma of the mamma proliferate, and are converted into an embryonic mass; this mass forms the indifferent, small-celled, or granulation tissue which constitutes the matrix of nearly all neoplasms. In alveolar sarcoma it is quite certain that the tumor starts from the endothelial cells of the lymph spaces, or elements which lie in the lymphatic system. This is shown by the fact that the glands of the axilla are infected in 66.66 per cent. of these cases, as against 68.07 per cent. for carcinoma, while in the other varieties of sarcoma invasion of the glands is met with in only 0.65 per cent. In addition to these nutritive disturbances, there is a new growth of vessels, so that there results a structure similar to that of granulations, out of which, through changes in the morphology of the cells and the character of the intercellular substance, the varieties of sarcoma originate. Hence, it will be seen that the textural modifications are the same, primarily, as those witnessed in ordinary granulation tissue.

The varieties and subvarieties of sarcoma of the female mamma are the same as those met with in other organs. The principal ones—the spindle-celled, round-celled, and giant-celled—are determined by the prevailing form of the cells, and the first two are further separated, in accordance with the dimensions of the cells, into the small-celled and large-celled. The subvarieties are constituted by the nature or arrangement of the intercellular substance; by various transformations or com-

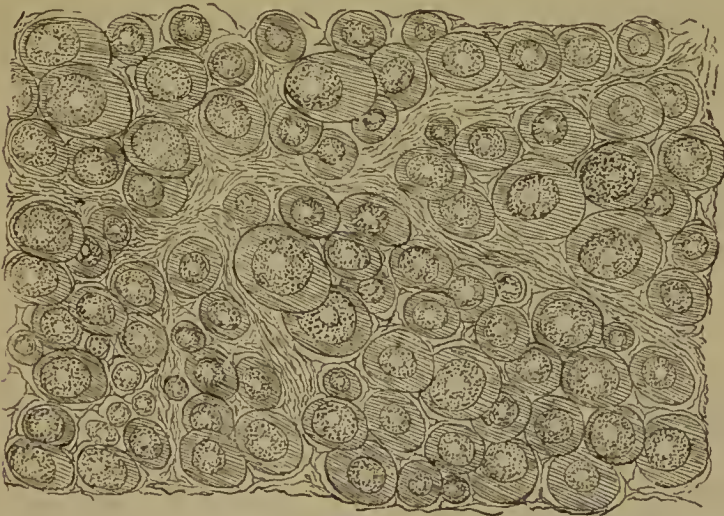


FIG. 26.



Small Round-celled Sarcoma,<sup>1</sup> showing a tissue composed of small round cells contained in an amorphous intercellular substance. Sections of four vessels indicate that they are mere channels with embryonic walls.  $\times 400$ .

FIG. 27.



Large Round-celled Sarcoma. The cells measure up to the  $\frac{1}{100}$  of an inch, and their protoplasm is largely hyaline, which is represented striated in the drawing. The nuclei are also large.  $\times 400$ .

binations with other neoplastic tissues; by the presence or absence of duct or retention cysts; and by the persistence of glandular elements.

<sup>1</sup> From a section of a tumor, of five months' duration, which had invaded the right mamma of a spinster thirty years of age, and was as large as a double fist. Its consistence was tense and fluctuating, and the skin was adherent and livid over its most



Hence, the modified forms of sarcoma are the fibrous, lymphoid, alveolar, myxomatous, cartilaginous, osteoid, calcifying, melanotic, telangiectatic, hemorrhagic, cystoid, solid, cystic, and adenoid.

1. **ROUND-CELLED SARCOMA.**—The structure of round-celled sarcoma, which is equivalent to the globocellular sarcoma of Virehow,

FIG. 28.



Lymphoid Sarcoma,<sup>1</sup> showing in its upper two-thirds the characteristic lymphadenoid structure.  $\times 240$ .

embryoplastic tumor of Robin, the medullary sarcoma of Müller, the granulation sarcoma of Billroth, and the encephaloid sarcoma of Cornil

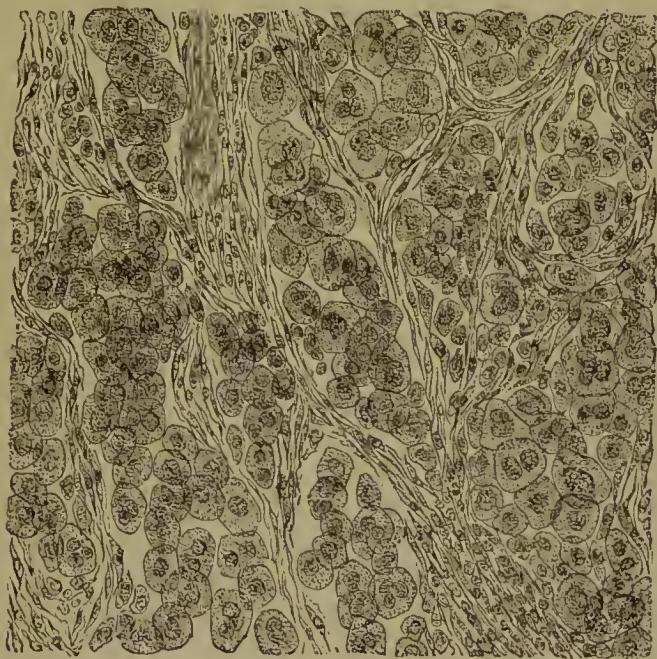
prominent portion. After removal the tumor was found to be almost entirely converted into a large cyst, which contained ten ounces of a citron-colored fluid rich in cholesterolin. Despite the fact that I removed the entire breast with the invaded skin and pectoral fascia, the disease recurred in the skin and adipose tissue in three months.

<sup>1</sup> From a 34-year-old woman, recorded by Billroth, in whom, during her third pregnancy, both breasts underwent sarcomatous degeneration, and death ensued, without operation, in six months and a half from the first appearance of the disease.

and Ranvier, is usually composed mainly, as is seen in Fig. 26, of fragile spherical cells of the size of lymph corpuscles, and provided, as a rule, with a single round or ovoid nucleus, which is large when compared with the protoplasm of the cell, and held together by a scanty, soft, amorphous, dimly granular, or finely fibrillated intercellular substance. Numerous large but delicate vessels pervade the tissue, and are very liable to rupture. In other, but rare, specimens the cells are of large dimensions, and are provided with correspondingly large nuclei, as in Fig. 27, from Formad. From these general features there are some histological variations whereby certain subdivisions are constituted.

*a. Lymphoid Sarcoma.*—When the intercellular substance forms a delicate reticulum of hyaline fibres, the meshes of which are occupied

FIG. 29.



Alveolar Large Round-celled Sarcoma,<sup>1</sup> showing active proliferation of the endothelial cells of the lymph spaces. The alveoli, which are merely distended lymph spaces, are separated from one another by trabeculae of young connective tissue.  $\times 400$ .

by small round cells, as in Fig. 28, from Billroth, so that the structure resembles the cytogenous or adenoid tissue of the lymph follicles, the tumor is known as lymphoid or lymphadenoid sarcoma.

*β. Alveolar, or Endothelial, Sarcoma.*—A still greater departure from

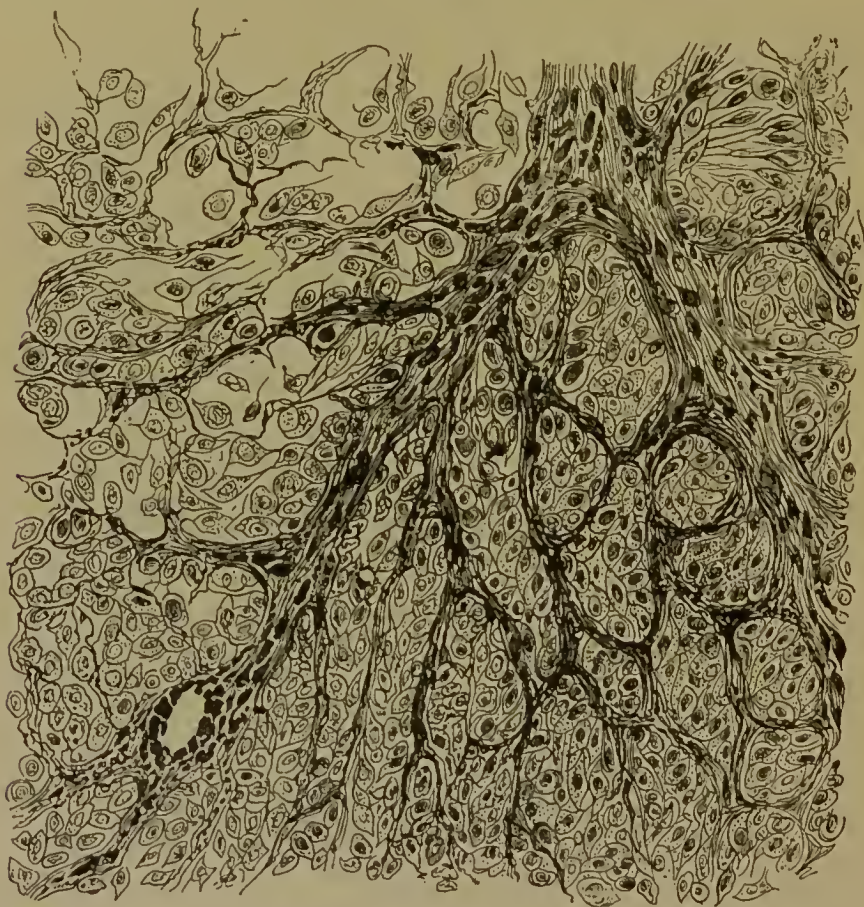
<sup>1</sup> From a section of a soft tumor of nine months' duration, removed by Agnew from a multiparous married lady fifty-three years of age. The subcutaneous veins were somewhat enlarged, but the skin, nipple, and axillary glands were normal. The disease recurred in the cicatrix in two months, increased rapidly, was painful and occasionally bled, and death ensued suddenly three months and a half subsequently.



the ordinary type is occasionally met with, the cells, as shown in Fig. 29, from Formad, being contained within the alveoli of a connective tissue meshwork, through which it bears a close resemblance to carcinoma, but from which it differs by the cells being intimately connected with the walls of the alveoli or the vessels which form the alveoli. The cells themselves are derived from the endothelial cells of the lymph spaces, the latter of which are distended to form the alveoli.

γ. *Melanotic, or Pigmented, Sarcoma.*—Among the round-celled sar-

FIG. 30.



Melanotic Alveolar Sarcoma,<sup>1</sup> showing pigmentation of the trabeculae of fibrous tissue, the cells being rarely affected.

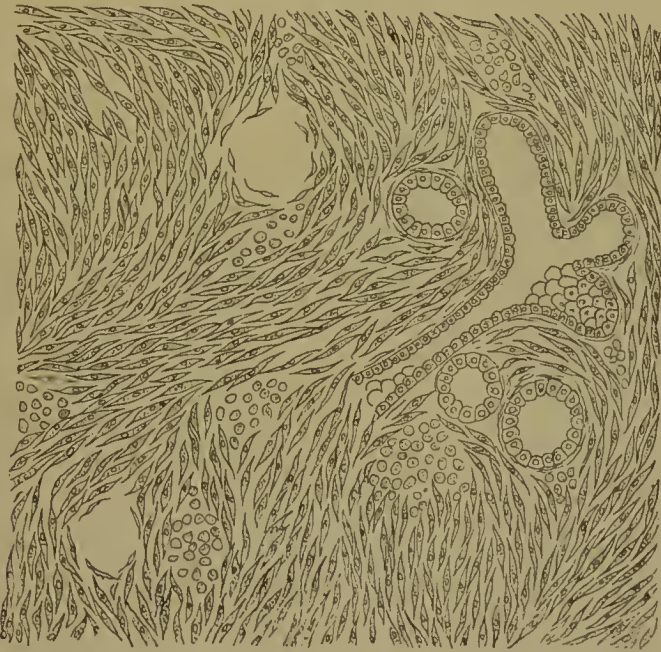
eomata may be included those tumors which are characterized by the deposition of black granules of melanin or altered hæmatoidin in the cells, intercellular substance, or in the fibrous trabeculae, as in Fig. 30, from Billroth, or in all of these constituents of the growth. In the

<sup>1</sup> From a section of a tumor, of three years' duration, removed by Billroth from a 10-para, sixty-eight years old. The skin was adherent and the axillary glands were infected. Death ensued, without local recurrence, in rather less than a year after the operation.

descriptions of the minute features of this rare subvariety round cells predominated and the stroma was alveolated.

2. SPINDLE-CELLED SARCOMA.—Spindle-celled sarcoma, which is synonymous with the fasciculated carcinoma of Müller, the albuminous sarcoma of Gluge, the fusocellular sarcoma of Virchow, the fibro-nucleated tumor of Bennett, the recurrent fibroid tumor of Paget, the fibroplastic tumor of Lebert, the plasmoma of Follin, and the fasciculated sarcoma of Cornil and Ranvier, has its pathological prototype in recent cicatrices, and is made up of fusiform cells, which vary greatly in size, as is shown in Figs. 31 and 32, although they are usually

FIG. 31.



Small Spindle-celled Sarcoma,<sup>1</sup> showing the spindle-celled tissue, in which are intercalated four ducts lined by low columnar epithelium. One of the ducts, with its terminal acini, is seen in longitudinal section. Some of the cells are cut transversely, and for that reason appear round. The two capillary blood-vessels in the left half of the section are mere channels without distinct walls.  $\times 400$ .

small, that is to say, short and narrow, and provided with a single ovoid nucleus. The intercellular substance is generally very scanty, and the tapering extremities of one cell are received between the bellies of two contiguous cells, forming a tissue which is composed of bands or fasciculi of closely aggregated cells: these cells interlace in every direction, so that a section discloses longitudinal, oblique, and transverse bundles, the last of which may be mistaken for round or oval cells.

3. GIANT-CELLED SARCOMA.—Giant-celled sarcoma is composed, as is seen in Fig. 33, from Billroth, of large multinucleated elements,

<sup>1</sup> From a section of the tumor delineated in Fig. 35.



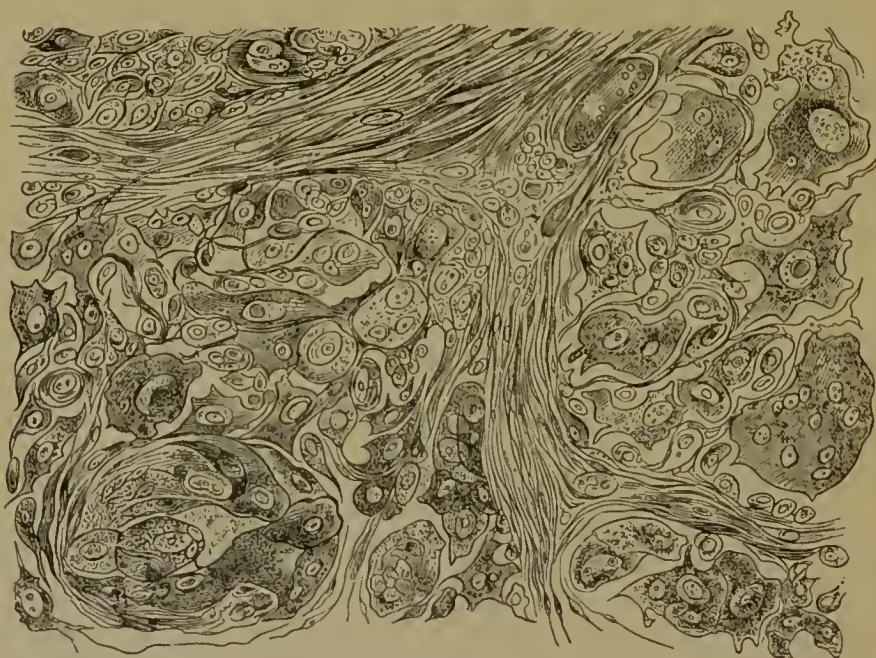
imbedded usually in a stroma of spindle and round cells, with the intervention of little, if any, visible intercellular substance. The tissue has

FIG. 32.



Large Spindle-celled Sarcoma:<sup>1</sup> *a, a, a*, transverse sections of spindle-cells. The cells are all highly granular, and vary in form, without departing materially from the usual shape.

FIG. 33.



Giant-celled Alveolar Sarcoma,<sup>2</sup> showing the enormous cells and the alveolar arrangement of the fibrous stroma.

therefore an apparently alveolar construction, which is the more strik-

<sup>1</sup> From the margin of a section of a tumor of less than two months' standing, removed, along with the entire breast, by Nancrede from a married and prolific woman thirty-five years of age. The skin was discolored and false fluctuation was so distinct that the growth had been punctured a few days previously under the supposition that it was an abscess. The tissue was almost diffuent and highly vascular.

<sup>2</sup> From a tumor of a few months' duration, extirpated by Billroth from a multipara forty-two years old. In two months infected glands were removed, and in two additional months a recurrent nodule near the cicatrix of the first operation was excised. The disease again attacked the axilla, and the patient died of erysipelas from the last operation. Secondary growths were not found post-mortem.

ing when the cells have undergone mucoid softening or are obscured by advanced fatty changes.

Apart from distension of the ducts, which gives rise to cystic sarcoma, the glandular structure of the mamma persists, to a greater or a lesser extent, in only one-third of all specimens of sarcoma, and then principally in the spindle-celled growths, which are denominated *adenoid sarcomata*, and which rarely attain a considerable volume before their removal. In none of the specimens which I have examined did the endothelial cells of the membrana propria participate in the proliferation, so that that structure remained intact, although it may be thickened, or, as more frequently happens, attenuated.

Mucoid transformation of the matrix, fatty infiltration of the cells, increased vascularization, the presence of cartilage, earthy salts, or of bone in the intercellular substance, and of connective tissue of new formation, constitute the subdivisions of sarcoma known as the myxomatous, lipomatous, telangiectatic, chondroid, calcifying, osseous, and fibrous, so that these terms may be employed as prefixes to denote the nature of the changes that have ensued, or designate the existence of certain subordinate tissues. The term cystic is employed to indicate dilatation of the ducts, while cystoid is prefixed to the tumor when it is the seat of softening cysts.

Of the varieties of sarcoma, the spindle-celled, which include the fibrous, constitute 68 per cent., the round-celled 27 per cent., and the giant-celled 5 per cent. of all cases.<sup>1</sup> Of the subdivisions, 50 per cent. are cystic, the term including the barren and proliferous cysts; 50 per cent. are solid or noncystic; 33 per cent. are adenoid, the glandular structures persisting principally in the spindle-celled growths; 12.80 per cent. are myxomatous, the combination being almost peculiar to the spindle-celled and cystic tumors; 7.69 per cent. are telangiectatic and hemorrhagic; 7 per cent. are cystoid, or the seat of softening cysts; 2.56 per cent. are osteoid; 2.56 per cent. are calcifying; 1.21 per cent. are cartilaginous; 1.92 per cent. are alveolar; 1.21 per cent. are lymphoid; and 1.21 per cent. are melanotic or pigmented.

Like the other encapsuled neoplasms of the mamma, circumscribed sarcomata are ovoid, rounded, or spherical, lobed or bossed, and seldom smooth and uniform, the surface irregularities being most marked in the cystic variety. As a rule, they are unattached to the gland, but push it aside, compress, and flatten it, or cause it to atrophy, although they are, in rare instances, united to it by a pedicle. Their consistence

<sup>1</sup> Of the 19 cases that have come under my personal observation, 13 were spindle-celled and 6 round-celled. Of the former, 5 were firm, small adenoid growths; 1 was a telangiectatic and myxomatous, and 1 a myxomatous medullary sarcoma; 6 were firm cystic, and in 2 of these the cysts were filled with vegetations. Of the 6 round-celled, 1 was lymphoid, 1 was a myxomatous cystic medullary growth, 2 were proliferous cystic, and 1 of these was medullary, and 2 were cystoid medullary tumors.

varies with their minute structure and degenerations, the pure spindle-celled and giant-celled tumors being firm, like fibromata, while the round-celled are soft and elastic. The spindle-celled, however, are soft in about one-third of all examples, when they will be found to be composed of small fusiform cells, or to have undergone myxomatous or fatty transformation, or to be the seat of interstitial hemorrhage. The round-celled are hard in about one-sixth of all cases, when they will usually be found to be rich in fibrous intercellular substance. In one of the best illustrations of round-celled tumors that I have ever seen the tissue was dense, so that they are by no means synonymous with soft, medullary, or encephaloid sarcomata, although they are usually much softer than the spindle-celled variety, since they are peculiarly rich in cells and bloodvessels, and since their intercellular substance is usually mucoid. The spindle-celled growths sometimes creak or cry under the knife, in which event they come under the category of fibrous sarcomata, from the large admixture of fibrous tissue. Their consistence varies, moreover, with their stage of development. If they are solid, it is entirely or almost uniform; while they are soft and elastic or soft and fluctuating at some points, and especially at the larger bosses, and hard at others, when they are the seat of cysts occupied by fluid or solid contents, or by both. In about one-fourth of the cystic growths, however, the tumor is firm throughout, in consequence of the cysts being so deeply seated as to elude detection by manipulation.

On section the spindle-celled tumors are usually smooth, succulent, and glistening, and of a white or grayish-white color, particularly if they are poor in vessels, the tint being rosaceous white or rosaceous gray when their vascular supply is larger. The round-celled tumors, on the other hand, are rarely pure white, but, from their relatively greater vascularity, reddish-white, reddish-yellow, or reddish-gray, the hue being not infrequently comparable to that of the foetal brain. When they are highly vascular the rosaceous tint is very marked, or they are pervaded by macroscopic vessels, or dotted with minute spots of ecchymosis, or patches or streaks of bright red or brown, or various intermediate shades of pigmentation. In not a few instances the soft brain-like tissue is so extensively interspersed with clots of blood and with tomentous cysts containing blood that the term hæmatoid or hemorrhagic sarcoma is not inappropriately applied to them, or the term fungus hæmatodes when they protrude through the skin. A pronounced yellowish color indicates fatty metamorphosis, which may pervade almost the entire tumor, or be confined to limited areas or to the vegetations alone, while the remainder is white or gray, thereby imparting to it a mottled aspect. A yellowish tint also denotes myxomatous changes, so that, as in the former instance, the mass of the



growth may be white or rosaceous white or rosaceous gray, and the vegetations be yellow. On the whole, however, gelatinous spots dotting the surface of the section are the best characteristic of this change. Now and then, or when great vascularity and the fatty and myxomatous degenerations are combined, there will be areas of yellow and red and spots of brown pigmentation, along with gelatinous dots. In point of fact, the color is so variable that it is extremely difficult to give an intelligible description of it. It need scarcely be added that melanotic sarcomata are pervaded by areas of dark-brown or black pigmentation. The cut surfaces of many of the largest specimens have also a lobed appearance from the close packing of the vegetations in the enlarged ducts which play the part of capsules.

The gross characters of the smaller tumors, which correspond to the adenoid sarcomata of Billroth, and which do not grow larger than a walnut in seven or eight months, are worthy of notice, as they differ from fibromata of the same dimensions in several particulars that are useful in establishing a differential diagnosis. Thus, of the five specimens of adenoid spindle-celled growths which I have extirpated, all were lobulated, firm, elastic, adherent to the gland, grayish-white in color, and tough on section. The fibromata, on the other hand, were hard, merely nodular, less adherent to the mamma, white, and more compact and tough on section. Under the microscope the glandular elements were undergoing obliteration to a greater extent in the former than in the latter.

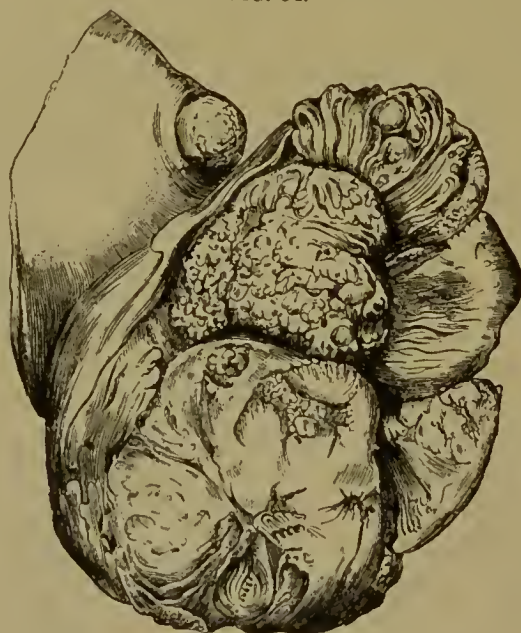
Inflammation and suppuration of mammary sarcoma are infrequent, but ulceration of the overlying tissues is so common that it occurred in 29, or 18.59 per cent., of the 156 cases that I have collated, a proportion which is nearly quadruple that met with in fibroma. As is witnessed in the latter tumor, the ulceration appears to be the result rather of inflammation and gangrene, or merely rupture, of the attenuated skin, than of its infiltration by sarcomatous cells; but in one case it depended upon exploratory puncture. In some examples it is doubtless due to invasion of the skin, but only one case, that of a crater-like ulcer, appears to have originated in this way. In 10 per cent. of the cases the ulcer presents itself in the form of a sloughing patch. Fungous protrusion almost invariably follows the perforation of the integuments, although in a remarkable instance recorded by Ashhurst,<sup>1</sup> the recurrent growth of which I exhibited at the Pathological Society, the ulcer subsequently healed. The protruding mass, which is usually an intracystic growth, as in Fig. 34, from Banks, varies in size from a hazelnut to three, four, and even five inches in diameter, and exhales a sanguinolent and fetid discharge, which may become more or less purulent. It is not, however, very prone to free hemorrhage or sloughing.

<sup>1</sup> *Trans. Path. Soc. Philada.*, vol. v. p. 230.



The ulcer itself is usually circular, and the surrounding skin is not only, as a rule, free from discoloration, but it is also unattached to the fungus, and everted, or rather elevated, on its sides. Now and then there are several ulcers, separated by bridges of sound tissue. From a diagnostic standpoint, it is worthy of notice that ulceration occurred in 7.69 per

FIG. 34.



Fungating Cystic Adenoid Sarcoma.

cent. of solid sarcomata against 18.76 per cent. of cystic sarcomata, and that it was met with in 25 per cent. of the giant-celled, 23.58 per cent. of the round-celled, and 17.58 per cent. of the spindle-celled tumors.

The metamorphoses and combinations of sarcomata are the myxomatous, fatty, telangiectatic, cystoid, calcareous, cartilaginous, and osseous. They usually begin in their centre, which may be quite soft and broken down, while the periphery is unchanged. Myxomatous degeneration is met with in 12.80 per cent. of all cases, being almost peculiar to the spindle-celled and cystic, and, along with fatty changes, is the most frequent cause of the large interstitial hemorrhages to which these tumors are liable. Although sarcomata are more vascular than the other neoplasms of the breast, they are only excessively so in 7.69 per cent. of all cases, in which event they are liable to be converted, in great part, into a dark-red, grumous, pultaceous material; and the dilated ducts often contain sanguinolent fluid, or even pure blood. In such cases minute examination discloses very numerous vessels, the adventitia of which is infiltrated with round cells undergoing fatty

degeneration, through which they lose their power of resistance, become varicose and dilated, finally give way, and emit a large quantity of their contents. Cystoid changes, due either to fatty or mucoid transformation of the glandular epithelium or to fatty changes of the sarcomatous cells, are met with in about 7 per cent. of all instances, the former being the more common and almost peculiar to solid sarcomata. These glandular and softening cysts must not, however, be confounded with the cysts which arise from ectasia of the ducts, and which constitute true cystic sarcoma. The contents of the false cysts may be yellowish, blood-stained, lactescent, mucoid, or gelatinous, and contain cholesterin. The cavities are rarely of large dimensions, although they may give rise to extensive areas of diffuent, broken-down tissue, and may be associated with extravasations of blood. Calcification is less common than in fibroma, as it was noticed in only four instances, or in 2.56 per cent. of all cases, in one of which ectaceous plates were found in the walls of a duct cyst, while in the others the mineral salts were interspersed throughout limited portions of the tumor. In three cases the growth was spindle-celled, and in one round-celled, and three were cystic. Chondrification is so rare that the only recorded cases are those of Bowlby,<sup>1</sup> cartilage cells being present in a cystic proliferous round-celled tumor, and of Coats,<sup>2</sup> who delineates a chondromatous fibrous sarcoma. Ossification has been described in four examples, or 2.56 per cent. of all cases. In that of Durham<sup>3</sup> the cystic tumor contained a plate of bony tissue, which consisted of close trabeculæ of comparatively well-developed osseous tissue. The three cases of Stilling<sup>4</sup> were also made up of true osseous trabeculæ, in the meshes of which spindle-cells, with a few giant cells, predominated in two, and round cells, with hyaline cartilage cells, in the third. In addition to these cases, Billroth<sup>5</sup> refers to a myxomatous sarcoma which contained small masses of true bone, but the case is devoid of history.

Sarcomata of the breast are generally solitary, since I find of 156 cases that only 10 were multiple, several growths existing in one gland in 7 and in both glands in 2, while in the tenth instance four tumors were present in one breast, and one tumor was found in its fellow. Their most common seat is in the vicinity of the nipple, and when they arise from the circumference of the organ they are usually found at its upper and outer quadrant. When of central origin they are, for the most part, cystic, while they are usually solid when they start from outlying lobules. In either event they evince a marked disposition to extend beyond the limits of their capsules, those of central origin gradu-

<sup>1</sup> *Trans. Path. Soc. Lond.*, vol. xxxiii. p. 306.

<sup>2</sup> *A Manual of Pathology*, Amer. ed., 1883, p. 707.

<sup>3</sup> *Trans. Path. Soc. Lond.*, vol. xxxv. p. 378.

<sup>4</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xv. pp. 247-253.

<sup>5</sup> *Op. cit.*, p. 48.

ally invading the entire gland and the surrounding soft parts, while the peripheral ones not only infect the latter structures, but also finally implicate the entire breast. As a rule, they give rise to broadly-based hemispherical tumors, but they are now and then pedunculated.

They occur as early as the ninth and as late as the seventy-fifth year, the average age of their first observation being 40.6 years. Of 148 cases in which the age is recorded—

1 appeared	at	9 years.	39 appeared	between	40 and 49 years.
14 “	between	10 and 19 years.	23 “	“	50 “ 59 “
16 “	“	20 “ 29 “	14 “	“	60 “ 69 “
40 “	“	30 “ 39 “	1 “	at	75 years.

Of the entire number, only 4, or 2.70 per cent., occurred before the sixteenth year, or during the developmental state of the mamma; 67, or 45.27 per cent., appeared between the sixteenth and fortieth years, or at a period when the breast and genitalia are functionally most active; and 77, or 52.02 per cent., after the fortieth year, or during the period of their functional decline. Spindle-celled tumors develop earlier in life than the giant-celled and round-celled, since the average age at which they were noticed was thirty-six years and seven months, against forty-seven years and three months for the giant-celled and forty-eight years for the round-celled. Unlike cystic and solid fibromata, cystic sarcomata appear at an earlier age than solid sarcomata, the average for the cystic being thirty-eight years and five months, against forty-three years for the solid variety. Hence it may be said that spindle-celled and cystic sarcomata are metaplasias of the functionally perfect mamma, and round-celled, giant-celled, and solid sarcomata are metaplasias of the declining gland. In point of fact, the fifteen sarcomata occurring before the age of twenty were spindle-celled in fourteen.

Of the patients, 33 were single and 57 were married when the tumor was first noticed, while the social condition is not noted in the remainder. Of the married women, 40 were multiparous, 6 had one child, and 8 were barren, while the question of children is not stated in 3. In 2 cases the disease showed itself during pregnancy, and in 4 soon after parturition. Of 38 subjects in which the menstrual function is recorded, all were regular save 1, who suffered from amenorrhœa. In 17 instances, or one in every nine and one-third, injury was assigned as the cause of the tumor; in 1 it developed at the site of an abscess; in 1 it was preceded by psoriasis of the nipple; while in none was it inherited. These facts show that the etiology of sarcomata is most obscure, since their development is rarely traceable to injury or disease, and is not influenced by hereditary predisposition, while the social state and menstrual irregularities or arrest are surely unimportant agents in their production.

The increase of sarcomata is more rapid than that of the other connective tissue neoplasms, but it is liable to great diversity, being independent of the age of the subject, and influenced by their structure, by their degenerations, and by the absence or presence of cysts. Of the solid sarcomata, I have met with six examples which varied from one to two inches in diameter in five, six, seven, and eight months; and even at the end of two or three years they may not be larger than an apricot<sup>1</sup> or a turkey's egg,<sup>2</sup> although they may, in their pure state, attain the volume of an adult head in four months,<sup>3</sup> or a circumference of twenty-five inches and a weight of four pounds and two-thirds in nine months.<sup>4</sup> When they are the seat of myxomatous degeneration or of softening cysts, they may weigh four pounds and twelve ounces,<sup>5</sup> or measure twenty-three inches in circumference and weigh six pounds in four months.<sup>6</sup> Of the cystic, as of the solid, variety I have seen examples in which it did not exceed a diameter of two inches in five and eight months, while it is rarely larger than a fist in one year. In exceptional instances, however, it may attain the volume of a double fist in three months,<sup>7</sup> or a weight of upward of ten pounds in the same number of months,<sup>8</sup> or a circumference of thirty-one inches and a weight of twelve pounds in one year.<sup>9</sup> As an evidence of its unequal rate of progress we may state that it may require eighteen months,<sup>10</sup> five years,<sup>11</sup> eighteen years,<sup>12</sup> or forty years<sup>13</sup> to reach the volume of a foetal head, or six years<sup>14</sup> or fifteen years<sup>15</sup> to attain the size of an adult head.

Like the cystic fibromata, sarcomata may remain stationary and of small dimensions for a long time, when, without obvious cause, they suddenly begin to increase, so that a nodule that has required fifteen years to attain the volume of a walnut reaches that of a double fist in three months;<sup>16</sup> or one which has remained the size of an egg for eighteen years acquires the volume of an adult head in a few months;<sup>17</sup> or one that has been quiescent and of the size of a walnut for twenty-five years suddenly begins to grow, and measures eighteen inches trans-

<sup>1</sup> Reverdin: *Bull. de la Soc. Anat.*, t. xlii. p. 708, and t. xlv. p. 285.

<sup>2</sup> Zambianchi: *Ibid.*, t. xlv. p. 314.

<sup>3</sup> Billroth: *Chir. Klinik*, Wien, 1869-70, p. 142.

<sup>4</sup> Bryant: *Trans. Path. Soc. London*, vol. xix. p. 387.

<sup>5</sup> Bennett: *Cancerous and Cancroid Growths*, pp. 12 and 256.

<sup>6</sup> Hewson: *Gross' System of Surgery*, 6th ed., vol. ii. p. 974.

<sup>7</sup> Post: *Medical Record*, 1872, p. 112.

<sup>8</sup> Glück: *Langenbeck's Archiv*, Bd. viii. Jahresbericht, p. 599.

<sup>9</sup> Pitha: *Ibid.*, p. 599.

<sup>10</sup> Hubert: *Bull. de la Soc. Anat.*, t. xlviii. p. 690.

<sup>11</sup> Reverdin: *Ibid.*, t. xlv. p. 281.

<sup>12</sup> Pick: *Trans. Path. Soc. London*, vol. xx. p. 347.

<sup>13</sup> A personal case.

<sup>14</sup> Hubert: *Bull. de la Soc. Anat.*, t. xlvii. p. 389.

<sup>15</sup> Berbèze: *Ibid.*, t. xli. p. 94.

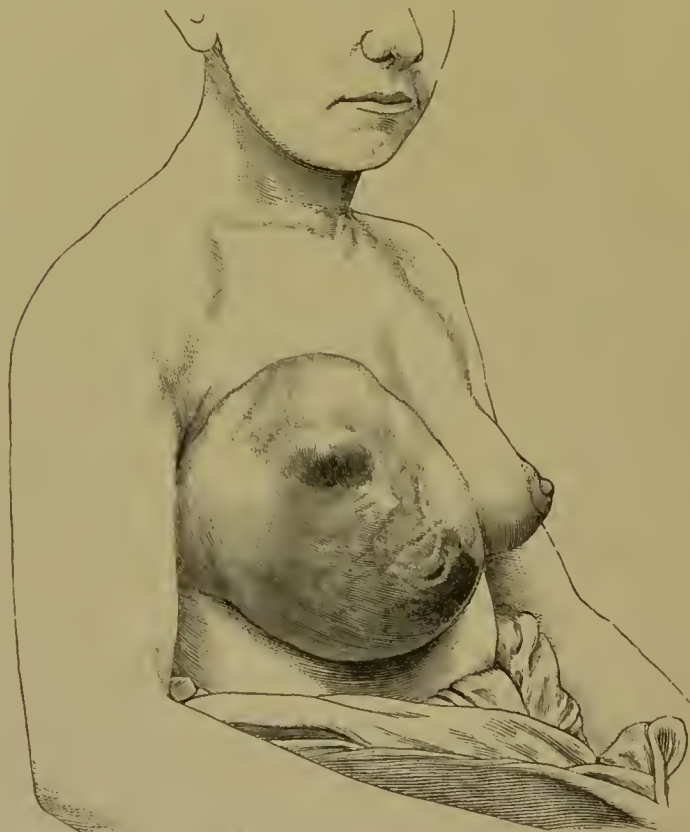
<sup>16</sup> Marignac: *Ibid.*, t. lii. p. 428.

<sup>17</sup> Tillaux, quoted by Cordier: *Thèse de Paris*, 1880, No. 494, p. 16.



versely by fourteen inches and a half vertically in three years;<sup>1</sup> or one that has been a year and a half in acquiring the volume of an egg grows to a circumference of twenty-six inches and a weight of seven pounds in an additional six months.<sup>2</sup> In such cases rapid accumulation of fluid and solid contents in the dilated ducts may be looked for; or the increase

FIG. 35.

Myxomatous and Telangiectatic Cystic Small Spindle-celled Sarcoma.<sup>3</sup>

in volume may be due to myxomatous changes and interstitial hemorrhage, as in the case from which Fig. 35 was taken. Under similar

<sup>1</sup> Anderson: *Trans. Path. Soc. London*, vol. xxiii. p. 254.

<sup>2</sup> Marehand: *Gaz. des Hôpitaux*, 1869, No. 51, p. 196.

<sup>3</sup> Myxomatous, telangiectatic cystic spindle-celled sarcoma, removed from a young and single lady, twenty-four years of age, who first noticed, seven years previously, or a few months after the establishment of menstruation, a lump as large as a hickory-nut just above and to the outside of the right nipple, which slowly increased until, at the end of six years, it was of the volume of the fist. It then began to grow rapidly, and measured, at the time of operation, twenty inches in circumference, or twelve inches and a half transversely and vertically, against seven and five inches for the opposite breast. The subcutaneous veins were only slightly enlarged; the nipple was buried in a crescentic fold; the skin was everywhere mobile and of normal tint, except above, over a large boss, where for two square inches it was adherent, attenuated, of a bluish tint, and pervaded by minute vessels; the outline of the breast was smooth and

circumstances their progress may be interrupted, of which I recently met with a notable example. On the 11th of November, 1886, I removed a proliferous cystic small spindle-celled tumor from a lady of sixty-five. At the age of twenty-five she accidentally observed a tumor as large as a chestnut at the inner side of the right nipple. It remained of that size until the age of sixty-one, when it began to grow, and during the past year had doubled its volume, so that it was larger than a foetal head, and the breast measured seven inches more in circumference than its fellow. Its gross features are shown in Fig. 17. Robin<sup>1</sup> has recorded a case in which a vegetating myxomatous spindle-celled tumor remained of the size of a hazelnut for six years, when it grew continuously for four years and reached the volume of a fist, and then doubled its size in three years and a half, and during the last six months, or fourteen years from its first appearance, attained a weight of nine pounds. Tillaux<sup>2</sup> extirpated a cystic tumor which grew from the size of a filbert to a hen's egg in three years, at which size it remained stationary for four years, when in six months it acquired the volume of an adult head. Although these seven cases were examples of cystic tumors, their peculiar histories countenance the view held by Billroth,<sup>3</sup> Labbé and Coyne,<sup>4</sup> König,<sup>5</sup> Duplay,<sup>6</sup> and myself, that fibroma is frequently metamorphosed into sarcoma through multiplication of its cells and increased vascularization. The opponents of this view of a change of type may urge that a sarcoma may remain latent for many years, when, without obvious cause, it begins to grow rapidly; but there is certainly no reason why a fibrous tumor should not serve as the mother tissue of a sarcoma as well as ordinary fibrous tissue. Be

regular, except above, where it was bossed; the gland was freely mobile on the chest; the temperature was five degrees higher than that of the opposite breast; and the axillary glands were not involved. Throughout its entire course the tumor was absolutely painless. The patient's menses were regular; there was no history of trauma or heredity; but both nipples had been the seat of psoriasis ever since she could remember, and she frequently picked off the crusts.

After removal by S. D. Gross in May, 1879, the breast weighed nearly three pounds. On section there was an escape of a bloody fluid, and the cut surfaces were of a dark red color, and interspersed here and there with dilated ducts, a few of which contained delicate vegetations. Above, and corresponding with the altered integument, there was a large softening cyst, occupied by fluid blood. Below the remains of the gland were seen to be flattened and spread out. The neoplasm itself was surrounded by a capsule. The disease recurred in three months, and was removed six weeks later, but was again reproduced before the wound healed. At the expiration of six months after the extirpation of the breast death occurred from exhaustion, but a post-mortem examination was refused.

<sup>1</sup> *Journal de l'Anat. et de Phys.*, t. x. p. 195, and *Bull. de la Soc. Anat.*, t. xlviii. p. 817.

<sup>2</sup> Cordier: *Thèse de Paris*, 1880, No. 494, p. 7.

<sup>3</sup> *Chir. Klinik*, Wien, 1871-76, p. 261.

<sup>4</sup> *Traité des Tumeurs Bénignes du Sein*, pp. 269, 283, and 363.

<sup>5</sup> *Lehrbuch der Spec. Chirurgie*, 4th Aufl., Bd. xi. p. 89.

<sup>6</sup> *Traité élément. de Path. Ext.*, par Follin et Duplay, t. v. p. 628.

this as it may, a long period of quiescence and an intermission of growth are not infrequent in sarcoma, and are of diagnostic value when compared with the progress of other neoplasms of the breast. As occurs in fibroma, continuous growth rather indicates freedom from cysts and vegetations, while sudden and rapid increase points to fluid accumulation and intracanalicular vegetations.

The growth of sarcomata might naturally be expected to be connected with menstruation, pregnancy, or lactation, or with conditions which render the mammary gland more vascular; but the influence of an increased flow of blood to the organ, which has been assumed by certain authors, is not confirmed by an analysis of the cases that I have collected. Thus, in only three examples was an increase in bulk witnessed at the menstrual period, while in two the tumor became smaller. In one the rapid growth began during pregnancy, and in two at the menopause.

From these considerations it follows that, while sarcomata constitute the most bulky of the mammary neoplasms,<sup>1</sup> their growth is so capricious that an average rate of increase cannot be assigned to them. On the whole, however, one is justified in concluding that the small-celled, the cystic, the myxomatous, and the telangiectatic increase more rapidly than the large-celled, the solid, and the pure tumors.

The active growth of the sarcomata is liable to be attended with marked elevation of the temperature, as was noted in two of my own cases, in one of which Seguin's surface thermometer indicated 100° against 95° for the opposite breast. In two other examples of cystic sarcoma there was an increase in the heat, as roughly estimated by the hand. All of these tumors were highly vascular and composed of small cells, so that elevation of the temperature may be said to be characteristic of telangiectatic and rapidly-proliferating growths. Further investigations in this direction may prove useful in determining the differential diagnosis of the connective tissue neoplasms, and should not be neglected.

During their further progress sarcomata continue, as a rule, mobile and free from superficial or deep attachments; the contiguous structures are not invaded by tumor elements; the skin remains natural in color and texture; the subcutaneous veins are not enlarged; the nipple is normal; and the associated lymphatic glands are not contaminated. To these general statements some exceptions must be noted:

a. While it is not uncommon for recurrent tumors to be more or less

<sup>1</sup> In his inaugural dissertation, *Ueber Fibro-Adenom der Mamma*, Göttingen, 1878, p. 13, Watson narrates a case from the practice of Kremer, in which the tumor weighed twenty-two pounds. Péan, in his *Leçons de Clinique chir.*, t. ii. p. 90, describes a myxomatous cystic spindle-celled sarcoma which weighed ten kilos, or more than twenty-six pounds; and a similar weight is recorded by Cordier in his *Thèse de Paris*, No. 494, 1880, p. 40, from the practice of Tillaux.

closely fixed to the pectoral muscle, and through it to the walls of the chest, it is a singular fact that the primary growth is, almost without exception, freely movable, and rarely attached even to the common integument. In a case of spindle-celled tumor recorded by Zambianchi—and it was an example of two growths in the same breast—the outlying tumor developed over the upper costal cartilages, to which it adhered, and sent a prolongation into the thorax.<sup>1</sup> In 6 additional instances, the muscles of the chest were involved in 5 and the paramammary fat in 1. The tumor was cystoid spindle-celled in 1, cystic spindle-celled in 2, round-celled in 1, osteoid round-celled in 1, and cystic giant-celled in 1. Just how often the skin is invaded is difficult of solution, since in some of the cases of ulceration it was doubtless converted into sarcomatous tissue, but microscopic data of this fact are wanting. Be this as it may, the skin was adherent in 15 examples, of which 10 were cystic and 5 solid tumors, the round-celled slightly predominating. If, in addition to the cases of invasion of the muscles, perichondrium, and connective tissue, these 15 cases be regarded as instances of invasion by tumor elements, sarcomata of the breast are to be regarded as locally infectious in 14.19 per cent. of all cases.

β. Although the skin may be stretched and attenuated and ulcerated, as already pointed out in 18.59 per cent. of all examples, it was discolored in only 36, or in 23 per cent.; and it is interesting to know that the changes in tint occurred 27 times in the cystic and 9 times in solid growths, 3 of which were the seat of degeneration cysts, and that the round-celled tumors predominated. In 21 the tint was red, in 4 bluish, in 10 violaceous, and in 1 livid.

γ. The superficial veins were enlarged in 24 instances, or in 15.39 per cent., but only to a slight extent in 2. In 18 the tumor was cystic, and in 6 it was solid, but in the latter it was the seat of extravasation of blood in one, and of mucoid cysts in the second. The spindle-celled growths predominated.

δ. The nipple was retracted or umbilicated in only 5, and these were examples of cystic growths.

ε. Of the 156 cases the lymphatic glands were enlarged, and now and then tender, in 19. In 14 of these the enlargement was associated with the primary growth, but in only 1, a case of alveolar pigmented round-celled sarcoma, were tumor elements detected.<sup>2</sup> In the remaining 5 the glands were extirpated along with recurrent growths, and in 2 of these—one an example of round-celled sarcoma communicated to me by Dr.

<sup>1</sup> Ante. Lagrange and Duret (*Bull. de Soc. Anat.*, t. xlviii. p. 516) refer to a case in which, on post-mortem examination of a female who had for many years an enormous sarcoma of the breast, the tumor separated the fibres of the pectoral muscles, passed between two ribs into the cavity of the mediastinum, and penetrated between and compressed the lobes of the lung, without infecting any of these structures.

<sup>2</sup> Billroth: *op. cit.*, p. 56.



Markoe of New York, and the second a case of alveolar giant-celled tumor<sup>1</sup>—were they infected. Hence the glandular enlargement was due to irritative hyperplasia in 16, in 10 of which ulceration of the tumor was present, while they were infected in only 3. This immunity of the glands from contamination is remarkable, and is a valuable sign in the differential diagnosis of malignant mammary growths.

A discharge from the nipple is not met with in the solid tumors, but occurs in one case out of every nine and a half of cystic sarcomata, the proportion being smaller than is met with in cystic fibromata, and is of great value as a symptom of enlargement of the ducts, although it is of itself unimportant in the differential diagnosis. In two instances from the practice of Bryant<sup>2</sup> the discharge was the first symptom, and preceded the detection of the tumor by three months in one and by two years in the other case. In a third case recorded by that surgeon<sup>3</sup> the flow was bloody and derived from highly vascular vegetations. In the case of Hubert<sup>4</sup> the tumor augmented in size at each menstrual period, when there was an occasional discharge of a citron-colored liquid. In the examples of Billroth<sup>5</sup> and Winslow,<sup>6</sup> in which the neoplasm developed during pregnancy, there was also a spontaneous escape of a serous fluid; while in those of Lebert<sup>7</sup> and Verneuil<sup>8</sup> a viscid transparent liquid was expelled by pressure.

The growth of sarcomata is attended with pain in 35.71 per cent. of all cases. In only 2.67 per cent., however, was attention first called to the tumor by suffering, and in the remainder it declared itself later, and varied in character and frequency in accordance with the variety of the sarcoma. Thus, in the solid form it was experienced in only 28 per cent. of the cases, and of these it was lancinating and continuous in 42.85 per cent., of an occasional darting character in 28.57 per cent., and lancinating and continuous only during the rapid increase of the tumor. In the cystic variety, on the other hand, it was felt in 41.93 per cent. of the cases, and in 69.23 per cent. of these it was, as a rule, severe and lancinating, and came on late in the disease, especially during rapid growth, when the tumor became tense through the increase of the contents of the cysts; while it was continuous and lancinating in 11.53 per cent., and slight in 19.23 per cent. In 14.28 per cent. of all cases it was only experienced when ulceration had set in, but ulceration and fungous protrusion provoked suffering in only 35.72 per cent. of all instances, and rarely increased it when it was previously felt. In one instance it was experienced only at the menstrual periods, while in

<sup>1</sup> Billroth: *op. cit.*, p. 58.

<sup>2</sup> *Guy's Hospital Reports*, ser. 3, vol. x. p. 115, and ser. 3, vol. xxviii. p. 468.

<sup>3</sup> *Ibid.*, vol. x. p. 120.

<sup>4</sup> *Bull. de la Soc. Anat.*, t. xlviii. p. 389.

<sup>5</sup> *Chir. Klinik*, Wien, 1869 and 1870, p. 142.

<sup>6</sup> *Maryland Med. Journ.*, vol. xii. p. 243.

<sup>7</sup> *Physiologie pathologique*, t. ii. p. 128.

<sup>8</sup> Valude: *Thèse de Paris*, 1885, No. 91, p. 131.

three it was aggravated, and in one diminished, at that period. In only five cases was the growth absolutely tender, although in many examples it was annoying from its weight and bulk, so much so, indeed, in a case recorded by Pick, that the woman repeatedly tapped the cyst with a penknife to rid herself of these features.

During their further progress, as we have already seen, sarcomata may invade their limiting capsules and the neighboring tissues, and finally ulcerate. Without, however, of necessity pursuing this course, their capsules may remain intact, but none the less may the tumor elements extend to the adjacent structures along the course of the blood-vessels, the adventitia of which is frequently the seat of small-celled proliferation, through which the tissues are converted into "latent zones of infection." These zones are not appreciable by the naked eye, but serve not only as the points of departure of the recurrences that are so often witnessed after their removal, but also as foci of general infection, with the production of deposits in the internal organs. Hence it is that the prognosis of sarcomata is eminently unfavorable, although there is still no little diversity of opinion among practical surgeons and pathologists on this point. Thus, Wilks and Moxon,<sup>1</sup> Cornil and Ranvier,<sup>2</sup> Labbé and Coyne,<sup>3</sup> and Erichsen<sup>4</sup> regard them, and particularly the cystic form, as being comparatively innocent, and only marked by a tendency to local reproduction. Labbé and Coyne and Erichsen deny the possibility of the general dissemination of spindle-celled tumors; and Erichsen, indeed, advances the doctrine that "the tendency to recurrence will, in most cases, gradually wear itself out, and after several operations have been required at intervals of months or a year or two the disease will cease to be reproduced, and a cure will be thus established;" although he adds that "instances are not wanting in which the tendency to the local reproduction of the sarcoma has been so active that it outran all possibility of complete extirpation, and eventually destroyed the patient." Virchow<sup>5</sup> states that while sarcoma may recur in loco, "it is a tumor of limited malignity, but fully capable of producing metastases;" and Lücke<sup>6</sup> endorses this view. Birkett,<sup>7</sup> Gross,<sup>8</sup> Ashhurst,<sup>9</sup> Klebs,<sup>10</sup> Billroth,<sup>11</sup> Annandale,<sup>12</sup> Winckel,<sup>13</sup> and Agnew,<sup>14</sup> on the other hand, fully recognize the malignant attributes of sarcomata as denoted by their

<sup>1</sup> *Lectures on Path. Anatomy*, p. 584, 1875.

<sup>2</sup> *Op. cit.*, p. 1162.

<sup>3</sup> *Op. cit.*, p. 431.

<sup>4</sup> *Science and Art of Surgery*, 8th Am. ed., vol. ii. p. 710.

<sup>5</sup> *Op. cit.*, p. 362.

<sup>6</sup> *Pitha and Billroth's Hdbch. der Allg. und Spec. Chir.*, Bd. ii. Abth. i. p. 194.

<sup>7</sup> *A System of Surgery*, edited by Holmes and Hulke, 3d ed., vol. iii. p. 451.

<sup>8</sup> *System of Surgery*, 6th ed., vol. ii. p. 973.

<sup>9</sup> *Philad. Med. Times*, vol. ix. p. 384, 1879.

<sup>10</sup> *Op. cit.*, p. 1118.

<sup>11</sup> *Op. cit.*, p. 60.

<sup>12</sup> *Internat. Encyclop. of Surgery*, vol. v. p. 842.

<sup>13</sup> *Lehrbuch der Frauenkrankheiten*, p. 754.

<sup>14</sup> *Princ. and Pract. Surgery*, vol. iii. p. 702.

capability of reproducing themselves, not only in the neighboring tissues, but also in remote parts; and other writers regard their progress as being "much more favorable" than that of mammary carcinoma.

The greatest obscurity exists in regard to the cystic sarcomata, which include the tumors in which the dilated ducts are more or less closely filled with vegetations. This uncertainty is due to the fact that many English and German pathologists and surgeons class cystic adenomata, cystic fibromata, and cystic myxomata under the term cystic sarcoma. Marcns Beek,<sup>1</sup> the latest writer on the subject, indeed, denies the presence of duct cysts in sarcoma.

In 1880, I certainly established the fact that all the varieties of sarcoma of the breast are malignant; and a careful study of 92 of the 156 cases upon which this account is based, and in which the final reports extend beyond the mere statement of the recovery or death of the patient, confirms this view.

Of the 92 cases, only 1 ran a natural course, it being an example of round-celled tumor of both breasts that proved fatal, with presumed secondary deposits, in seven months from the first appearance of the disease. The remaining 91 were subjected to the knife. Of these, 32 were well for periods which varied between one month and ten years and nine months; 42 were marked by local recurrence; in 8 not only was there regional reproduction, but metastases were found post-mortem; 3 recurred, with unmistakable evidences of general dissemination; 4 were characterized by metastases, and 2 by presumed metastases, without recurrence. In other words, 64.83 per cent. of these cases were endowed with malignant features. Let us examine these general statements more in detail: 32 patients were alive and well for an average period of forty-nine months and ten days after operation, the disease having existed, on an average, for sixty-nine months and eleven days before surgical interference, so that the mean life of these subjects was nearly ten years. The period of freedom from recurrence was—

From 1 to 12 months in 4 cases. <sup>2</sup>				For 7 years and 3 months in 1 case.			
" 1 "	2 years	" 4 "		" 8 "		" 1 "	
" 2 "	3 "	" 7 "		" 9 "	" 11 "	" 1 "	
" 3½ "	4 "	" 5 "		" 10 "		" 1 "	
" 4 "	5 "	" 5 "		" 10 "	" 4 "	" 1 "	
				" 10 "	" 5 "	" 1 "	
				" 10 "	" 9 "	" 1 "	

As has been seen, there was local reproduction in 53 cases. In 45, in which the date is noted, the periods of recurrence were as follows:

<sup>1</sup> *Dictionary of Practical Surgery*, edited by Heath, p. 133.

<sup>2</sup> The shortest periods were 1 month, 4, 6, and 10 months.

2 cases in 3 weeks.	3 cases in 12 months.
2 " " 1 month.	1 case " 15 "
7 " " 2 months.	1 " " 17 "
3 " " 3 "	2 cases " 18 "
2 " " 3½ "	1 case " 20 "
2 " " 4 "	1 " " 21 "
5 " " 5 "	3 cases " 24 "
3 " " 6 "	1 case " 29 "
1 case " 7 "	1 " " 32 "
1 " " 8 "	1 " " 36 "
1 " " 9 "	1 " " 48 "

The table shows that more than one-half, or 57.7 per cent., of the reproductions took place in six months, while after twelve months there were only 13, or 28.8 per cent., and of these there were only 4, or 8.8 per cent., after two years. These statements lead to the belief that the chances for the patient are relatively good after the lapse of two years, and that the prognosis is all the more favorable as the period of freedom from signs of local contamination prolongs itself. As the latest date of reproduction was four years, we may assume that the 12 cases of the first table which remained well after the lapse of that time were permanently cured. The average date of recurrence was ten and a half months, and the total life of these patients from the first observation of the disease to the final report after the last operation was seven years and nine months. The number of recurrences, or operations for recurrence, was 1 in 23 cases, 2 in 13 cases, 3 in 7 cases, 4 in 1 case, 5 in 4 cases, 6 in 2 cases, 7 in 1 case, 12 in 1 case, and 22 in 1 case.

While the average was ten and a half months, the histological constitution of the growth appears to have exerted a marked influence upon the date of recurrence. Thus, the mean date of local reproduction was four months and twenty days for the round-celled, eleven months and twenty-seven days for the spindle-celled, and twelve months and ten days for the giant-celled. The cystic tumors recurred in eight months and five days, and the solid in thirteen months and nine days; and this contrast becomes the more striking when we state that the average date of recurrence for cystic round-celled growths was three months and four days as against six months and eight days for the solid round-celled, and nine months for cystic spindle-celled as against sixteen months for the solid spindle-celled.

Of the 91 cases, metastatic growths, as demonstrated post-mortem or by unmistakable evidences during life, had formed in 17, or 18.68 per cent. There can be no doubt that this estimate is too low, since of 20 examinations of persons dead from the effects of the primary operation, or dead after secondary operations, metastatic growths were found in 12, or 60 per cent. The total duration of life from the first appearance of the primary tumor to the death of the 17 patients was fifty-



seven months, nine months having been the shortest, and twenty-five years and seven months the longest, period. The relative frequency of the seats of the secondary deposits is shown by the following statement :

Lungs . . . . .	in 10 cases.	Pleura . . . . .	in 1 case.
Liver . . . . .	" 4 "	Heart . . . . .	" 1 "
Brain . . . . .	" 3 "	Kidney . . . . .	" 1 "
Dura mater . . . . .	" 1 case.	Muscles . . . . .	" 1 "
Retroperitoneal glands	" 1 "	Bones . . . . .	" 1 "
Mediastinum, . . . . .	" 1 "		

The prognosis is materially influenced by the age of the patient and by the size and rate of increase of the tumor. Thus, before the age of thirty-five, when the mammary gland is functionally most active, a small, slowly-growing sarcoma does not recur, while a rapidly-increasing tumor, especially the cystic variety, is very liable to recur. Among the latter class of cases, 60.71 per cent. were characterized by recurrence, and 10.71 per cent. by metastatic tumors. Of these, the solid sarcomata recurred in 53.84 per cent., and gave rise to secondary growths in 7.69 per cent., while the cystic recurred in 66.66 per cent., and were marked by metastases in 13.33 per cent. It does not appear, however, as many writers assert, that the more tender the age the more rapid is the growth of, and the more malignant is, the neoplasm. Thus, of 15 cases, the ages of which varied from nine to nineteen years, or sixteen and a half years on an average, the tumor had been in existence on an average for seven and a half years before its removal, and 28.57 per cent. remained well, while 71.43 per cent. recurred, and metastases were not observed in a single instance. After the thirty-fifth year, on the other hand—and the danger increases with advancing age—the greater is the liability to metastases, as in this class of cases 19.35 per cent. were generalized and 43.54 per cent. recurred. Of these, the solid tumors recurred in 47.05 per cent., and gave rise to secondary growths in 23.54 per cent., while the cystic recurred in 44 per cent., and were marked by metastases in 16 per cent. of all cases. In other words, a sarcoma occurring in a functionally active breast evinces a marked disposition to recur after operation, with less disposition to metastases, while a sarcoma of the declining breast recurs less frequently, but is generalized in a greater number of instances.

The prognosis is also influenced by the histological constitution and the stage of evolution of the tumor. Of the spindle-celled, 65.10 per cent. recur, and 20.40 per cent. give rise to metastatic growths; of the round-celled, 60 per cent. recur, and 25 per cent. are generalized; of the giant-celled, 57.14 per cent. recur, and in none are there metastases; of the solid, 64.58 per cent. recur, and 25 per cent. are dissemi-

nated ; while of the cystic, 51.16 per cent. recur, and 11.62 per cent. are generalized. Hence, while the round-celled are the most malignant, the metastasis of the spindle-celled is by no means to be denied, nor can we say, with certain writers, that the cystic variety is an innocent tumor or one of limited malignity, since it recurs in more than one-half of all cases, and generalizes itself in about one case out of every nine. These investigations demonstrate that the usual statements, which are so opposed to the actual facts, as to the malignity of sarcomata, are due either to their not having been based upon a careful analysis of a sufficient number of recorded cases confirmed by minute examination, or to the confounding of cystic sarcomata with other cystic growths which never infect the economy.

While I have been unable to collate cases in which the disease ran a natural course, through which we are deprived of data bearing upon the duration of life in this class of patients, and comparing them with the average duration of life of those subjected to the knife, there can be no doubt that operations do result in permanent recoveries and prolong life, even if a final cure is not attained. From an inspection of the two tables on a previous page, it appears that recurrence may be delayed for four years, and that 12 subjects were alive and well after four years ; so that if we take four years as the criterion of safety, the 91 operations show 13.18 per cent. of cures.

Although the recurrent regional disease is more intense than the primary, and other reproductions generally follow in quick succession, the removal of tumors as fast as they appear certainly alleviates suffering, prolongs life, averts visceral contamination, and occasionally brings about a cure. Thus, Bryant<sup>1</sup> removed the entire breast for a round-celled sarcoma on January 9, 1883, and up to February 10, 1886, performed twelve operations for multiple recurrent growths, the opposite breast being the seat of an atrophic scirrhus of sixteen years' standing. Billroth<sup>2</sup> enucleated a cystic sarcoma, and removed four recurrent growths in four years, the breast being extirpated at the last operation, and the woman was free from disease three years subsequently. Erichsen<sup>3</sup> extirpated the entire breast for a cystic growth of twenty-seven years' standing in 1859, and removed recurrent growths in 1861, 1863, 1864, 1865, and 1866, death ensuing from paralysis "some years after the last operation." In Heath's<sup>4</sup> case of removal of the gland for a spindle-celled tumor six operations for recurrences were done in thirteen years, and the patient was alive with a seventh recurrence. In that of Haward<sup>5</sup> a spindle-celled tumor was removed in

<sup>1</sup> Private communication, March 6, 1886.

<sup>2</sup> *Op. cit.*, p. 68.

<sup>3</sup> *The Science and Art of Surgery*, 8th Amer. ed., vol. ii. p. 711.

<sup>4</sup> *British Medical Journal*, 1878, vol. i. p. 194.

<sup>5</sup> *Trans. Clin. Soc. London*, vol. vii. p. 106.

1860, and recurrent growths were excised in 1863, 1869, and 1873. The patient died, without metastases, from the effects of the last operation, but life was prolonged, as in the preceding instance, for thirteen years. Riedel<sup>1</sup> removed six recurrences in twenty years following an operation for giant-celled sarcoma, and on death there were no metastases. Gay,<sup>2</sup> in May, 1865, enucleated from the same breast two cystic spindle-celled sarcomata of six years' standing. Recurrent growths were removed in July, 1867, with the entire gland, in May, 1869, and May, 1874, in June, 1878, in May, 1880, and in June, 1881, so that life was extended for fourteen years, and the woman was still living at the date of the last report. The case of S. D. Gross,<sup>3</sup> however, is, so far as I know, the most remarkable on record. In March, 1857, a single woman, aged forty-four, discovered a small tumor in the left breast, which, on enucleation the following October, proved to be a small spindle-celled sarcoma. During the next sixteen months two more partial operations were performed, and a fourth tumor, along with the entire breast, was extirpated in May, 1859. In three months and a half the knife was again required, and soon afterward other tumors were removed. In 1860 she underwent eleven operations, and six in 1861, the last of which was performed in September of that year, so that she was subjected to twenty-two operations for fifty-one recurrent tumors in four years. They varied in size from an almond to a hen's egg, appeared at or near the cicatrices in a few weeks, and rapidly assumed a fungating aspect. Large portions of the pectoral and also of the external and internal intercostal muscles were cut away, so that during a deep inspiration there was a slight protrusion of the pleura. Ten years and nine months after the last operation she was in perfect health. In these eight cases there was no lymphatic involvement and the general health was unimpaired.

A study of the preceding facts shows that, like carcinoma, sarcoma is a malignant growth. It differs, however, from the former in many important features, which are shown in the following statement:

	Sarcoma.	Carcinoma.
Invasion of the skin by tumor elements . . . .	9.67 per cent.	62.26 per cent.
Invasion of the chest-walls . . . . .	3.87 " "	15.69 " "
Invasion of the paramammary connective tissue .	0.64 " "	12.70 " "
Primary invasion of the axillary glands . . . .	0.64 " "	68.07 " "
Local reproduction after removal . . . . .	58.24 " "	66.80 " "
Metastases found post-mortem . . . . .	60.00 " "	51.00 " "
Average duration of life . . . . .	81 months.	38.5 months.
Permanent cures . . . . .	13.18 per cent.	11.83 per cent.

<sup>1</sup> *Centralblatt für Chirurgie*, 1881, Bd. viii. p. 636.

<sup>2</sup> *Trans. Path. Soc. London*, vol. xvi. p. 240; vol. xx. p. 359; vol. xxv. p. 233; vol. xxxi. p. 272; and vol. xxxiii., Suppl., p. 24.

<sup>3</sup> *A System of Surgery*, 6th ed., vol. ii. p. 964.

From this table it appears that sarcoma is less infectious locally, but more infectious as regards the general system, than carcinoma. Its more relatively benign character is shown not only by the larger proportion of cures, but also by the fact that the average duration of life, from the first observation of the disease to the date of the last removal after operation, is forty-two months longer; and this contrast becomes the more striking when it is stated that the majority of the sarcomatous patients were still living, and the majority of the carcinomatous subjects were dead. Not only is this statement true for sarcomata in general, but it holds good for the three varieties, since the average life for round-celled sarcoma is fifty-four months, ninety months for the spindle-celled, and one hundred and eight months for the giant-celled.

The diagnosis of small, slowly-increasing fibrous sarcomata is by no means easy, as they are very liable to be confounded with fibromata, particularly when they arise at the circumference of the mamma. A tumor, however, of soft, apparently fluctuating consistence, with elevated temperature, conveying the impression of an abscess, and occurring in young women, which attains a large volume in a few months, can scarcely be anything else than a medullary sarcoma. On the whole, the diagnosis is based upon their indolent origin, mobility, elastic or unequal consistence, lobulated outline, rapid increase, freedom from lymphatic involvement, their tendency to ulcerate, the not infrequent discoloration of the skin and enlargement of the subcutaneous veins, and possibly elevation of temperature; upon the suffering which they awaken late in the disease; and upon their greatest frequency after the fortieth year.

The only tumors met with before the age of sixteen are fibromata and sarcomata, the former being more than twice as common as the latter. The fibromata are always solid, and grow slowly, while the sarcomata are cystic in three-fourths of all instances, and medullary in the remaining fourth, and, as a rule, grow rapidly. Hence cystic and medullary tumors at this period of life are sarcomata and nothing else.

Between the spindle-celled, round-celled, and giant-celled there are some marked similarities which render their differentiation difficult. The spindle-celled, however, are characterized by their development at a comparatively early age, by the attendant suffering, by the enlargement of the subcutaneous veins, by their slow reproduction after removal, and by their long life. The round-celled, on the other hand, appear, as a rule, at a comparatively late age, and are painless; but the skin is liable to be discolored and ulcerated, and recurrence is rapid and the duration of life is relatively short. The giant-celled likewise appear late in life, but are painful; discoloration of the skin and ulceration are also common; but there is no enlargement of the veins, while irrita-



tive enlargement of the axillary glands is frequent. Local reproduction is delayed longer than in the other varieties, and the duration of life is remarkable.

These points are set forth in the following table, in which the affinities and contrasts of the three principal varieties may be seen at a glance :

	Spindle-celled.	Round-celled.	Giant-celled.
Average age of appearance . . . . .	36 years.	48 years.	47 years.
Appear before sixteenth year . . . . .	12.08 per ct.	0.83 per ct.	0 per ct.
Pain . . . . .	60.00 "	10.81 "	43 "
Skin discolored . . . . .	20.88 "	32.35 "	25 "
Ulceration . . . . .	17.58 "	23.58 "	25 "
Veins enlarged . . . . .	17.58 "	11.76 "	0. "
Glands swollen . . . . .	6.59 "	8.82 "	37.5 "
Glands infected . . . . .	0. "	2.94 "	0. "
Adjacent tissues invaded . . . . .	13.18 "	17.64 "	25 "
Local reproduction . . . . .	65.10 "	60. "	57.14 "
" " average date of . . . . .	12 months.	4 $\frac{2}{3}$ months.	12 $\frac{1}{3}$ months.
Metastatic deposits . . . . .	20.40 per ct.	25 per ct.	0 per ct.
Average life with operation . . . . .	90 months.	54 months.	108 months.

Between the solid and cystic varieties there are certain distinctions which are useful in establishing a differential diagnosis. The former develop at about the forty-third year; the skin is discolored in 11.53 per cent.; ulceration occurs in 7.69 per cent.; the veins are dilated in 7.69 per cent.; there is no discharge from the nipple, nor is it retracted; pain is met with in 28 per cent.; the surrounding tissues are invaded by tumor elements in 11.54 per cent.; the lymphatic glands are enlarged in 11.54 per cent., and infected in 1.28 per cent.; recurrence ensues in 64.58 per cent., and metastatic growths are met with in 25 per cent. of all instances. Cystic sarcoma starts, as a rule, at the thirty-eighth year, and is not, as is asserted by many writers, most common between twenty and thirty-five years, as just as many cases occur after as before the latter age; it grows more rapidly than the solid variety, and its increase is often sudden after having remained stationary or advanced slowly for some time. Now and then, after evacuation of the fluid of the superficial cysts, their solid contents can be detected by manipulation; their consistence is, as a rule, unequal, and they are more largely lobulated than the former variety. The skin is discolored in 34.61 per cent.; the tumor ulcerates in 18.76 per cent.; the veins are enlarged in 23.07 per cent.; the nipple is retracted in 6.41 per cent., and discharges fluid in 10.25 per cent.; pain is experienced in 41.93 per cent.; the adjacent tissues are infected in 16.66 per cent.; the lymphatic glands are swollen in 5.12 per cent., but they are never invaded by tumor elements; while the growth recurs in 51.16 per cent., and becomes generalized in 11.62 per cent. of all cases.

There are no signs by which cystic sarcomata can be absolutely dif-

ferentiated from cystic fibromata, with which they are so frequently confounded. The latter develop earlier in life, and a discharge from the nipple is more common than in the former; but ulceration and enlargement of the veins are only one-half as frequent, and they are not attended with glandular enlargement or malignant features. It should, however, be stated that the largest proliferous cystic tumors met with in old, married multiparæ are generally sarcomata.

As no attempt has hitherto been made to describe the life-history of the giant-celled variety and some of the modified forms of mammary sarcoma, the following facts will be found to be not devoid of interest: In 8 cases of giant-celled tumors that I have collated, the average date of their first observation was forty-seven and a quarter years, or at the ages, respectively, of forty-two, forty-five, forty-five, forty-six, forty-six, forty-nine, fifty, and fifty-five. Of the six cases in which the social condition is noted, 3 were married, of which 2 were parous, and 3 were single. The tumors were solid in 6, of which 1 was alveolar, and cystic in 2. The skin was violaceous in tint and adherent in 1 case of cystic tumor, and red and stretched in 1 of solid tumor. In one of the cystic tumors there was firm attachment to the great pectoral muscle. Ulceration was met with in 3, of which 2 were solid and 1 was cystic. The axillary glands were enlarged, but not infected, in 3 cases, 2 of which were cystic and 1 was solid; and enlarged lymphatic glands were detected in 3 cases of recurrence of solid tumors, in 1 of which, an alveolar growth, they were invaded by tumor elements.

All of the cases were subjected to the knife. In 1 the history ceases with the operation.<sup>1</sup> In 3 there was no recurrence, and the patients were alive subsequently for ten years and five months,<sup>2</sup> three months,<sup>3</sup> and ten years.<sup>4</sup> In 4 the tumor recurred. In Billroth's<sup>5</sup> case a reproduction, with infected glands, was removed in two months, and another similar operation was performed in a few months. The patient died of erysipelas, but metastases were not found post-mortem. In the case of Riedel<sup>6</sup> six recurrent growths were removed in twenty years, and on death it was found that the patient was free from metastases. In the case of Estlander<sup>7</sup> a recurrent growth, along with the glands of the axilla, was removed in two years and five months, and the patient was well five years and nine months subsequently; while in the case of Stanley<sup>8</sup> the patient died with a recurrent tumor in two years after the extirpation of the breast. The average total duration of life of these

<sup>1</sup> Estlander: *Rev. Mens. de Méd. et de Chir.*, 4, 1880, p. 795.

<sup>2</sup> *Ibid.*, p. 796.

<sup>3</sup> Lancereaux: *Bull. de la Soc. Anat.*, t. xxxv. p. 292.

<sup>4</sup> Paget: *Trans. Clin. Soc. London*, vol. vii. p. 108.

<sup>5</sup> *Centralblatt für Chirurgie*, 1881, No. 40, p. 636.

<sup>5</sup> *Op. cit.*, p. 58.

<sup>7</sup> *Ut supra.*

<sup>8</sup> Paget: *Lect. on Surg. Path.*, 3d ed., p. 555.

patients from the first observation of the disease to the final report was nine years.

It will thus be seen that giant-celled, or myeloid, sarcoma sets up irritative enlargement of the lymphatic glands in 37.5 per cent. of all cases; that the skin is discolored, the tumor ulcerated, and the surrounding tissues are infected in 25 per cent.; that the subcutaneous veins and nipple are normal; and that, while it recurs in 57.14 per cent., it never gives rise to metastatic growths.

Osteoid sarcoma, or the variety which contains true osseous tissue, has been met with at the ages of twenty-seven, forty-six, forty-nine, and fifty-one years, the average being forty-three years. It occurs usually in married multiparæ; as a rule grows slowly; is hard, except when it has undergone cystoid degeneration; acquires large dimensions in one-half of the cases; and is painful during its rapid growth. It ulcerates in one-fourth of all instances; invades the adjacent tissues in one-half; does not infect the lymphatic glands, nor is it marked by dilatation of the superficial veins.

The case recorded by Durham<sup>1</sup> is devoid of further history. Of the three reported by Stilling,<sup>2</sup> in which an operation was practised, one died in twenty-three months, without recurrence, but with evidences of metastatic growths in the lungs and pleuræ; one died of pneumonia on the third day, with secondary tumors of the lungs and sarcomatous thrombosis of the veins of the pectoral muscle, the disease having existed for eighteen months; and the third was characterized by two local reproductions and a metastatic growth of the left ventricle of the heart about sixteen weeks after the primary operation, the total life having been ten years and four months. The average life of these cases from the first observation of the disease until its termination was fifty-seven months, and the average life after operation was thirteen months and a half. Hence, metastases occurred, or were presumed to have occurred, in all the cases, and of those who survived the knife local reproduction was witnessed in one-third, and a recurrent growth would certainly have been formed if the patient with sarcomatous pectoral veins had survived. From these considerations osteoid sarcoma must be regarded as the most malignant of the mammary sarcomata.

The life-history of pigmented alveolar round-celled sarcoma can only be based upon two cases. In that of Billroth<sup>3</sup> a hard tumor, of three years' duration, as big as a child's head, and adherent to the skin, was removed, along with infected glands, from a multipara sixty-five years old. The patient died of exhaustion, without recurrence, in eight months, but there was no post-mortem examination. In the case of

<sup>1</sup> *Trans. Path. Soc. London*, vol. xxxv. p. 378.

<sup>2</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xv. pp. 247-253.

<sup>3</sup> *Op. cit.*, p. 56, Fig. 57.

Butlin<sup>1</sup> a tumor of seven years' standing was removed in 1880 from the otherwise normal breast of a woman of fifty-eight. Recurrent growths were extirpated in 1882, 1884, and 1886, but the history ceases with the last operation. In addition to these cases, Wacker<sup>2</sup> describes a case of multiple melanotic alveolar round-celled sarcoma of both breasts, with infection of the glands of the left axilla and metastatic tumors of the spleen, mesenteric glands, and brain. The disease was thought to be secondary to melanotic sarcoma of the skin of the mammæ. Winekel depicts a proliferous myxomatous melanotic sarcoma, but the case is devoid of history.<sup>3</sup>

The treatment may be summed up in a few words. Before the age of thirty-five a slowly-growing fibrous sarcoma does not return, so that simple enucleation from its capsule will suffice. In all of the other varieties, and especially in the soft tumors of young women, which attain a large volume in a few months, and in the rapidly-increasing tumors, including the cystic variety, after the thirty-fifth year the treatment must be thorough. In such cases, as has been pointed out, local recurrence after the ordinary method of extirpation may be looked for in nearly six-tenths of all operations. To guard against this, my firm conviction is that the entire breast, including its investments, should be amputated, the pectoral fascia dissected off, and the exposed muscle mopped with a strong solution of chloride of zinc or seared with the hot iron. As it is impossible to tell beforehand the exact nature of the tumor, the axilla should be opened and enlarged glands searched for and removed. These cases are desperate, and do not admit of half measures; and the end in view certainly justifies what at first sight appears to be a harsh practice. Should this advice not meet with approval, the very least that the surgeon should do is to extirpate the entire breast, along with any skin that may be invaded, especial care being paid to the complete removal of every particle of paramammary fat and the fascia of the pectoral muscle, in which tissues experience shows that recurrence takes place. In the event of repululation the growths should be freely excised as fast as they appear, as such a practice not only prolongs life, but may bring about a final cure.

### MYXOMA.

Of the connective tissue neoplasms of the mammary gland, by far the most rare is that denominated myxoma by Virchow, which is synonymous with the collonema of Müller, the gelatinous sarcoma of Rokitsansky, the net-celled sarcoma of Billroth, the soft and succulent form of fibrocellular tumor of Paget, and the colloid, mucous, or gelat-

<sup>1</sup> *Lancet*, January 8, 1887, p. 72.

<sup>2</sup> *Inaug. Dissert.*, Rostock, 1884, p. 15.

<sup>3</sup> *Lehrbuch der Frauenkrankheiten*, p. 756.



inous tumor of other pathologists. Rindfleisch briefly describes it as *cystosarcoma mucosum*, and Birkett refers to it as colloid growth, but the history of its life is lost in that of colloid carcinoma. I have myself never met with it, although I recently examined a specimen removed by my friend Dr. J. M. Barton, and, after careful research, I have been able to collect only fourteen examples, confirmed by minute inspection.

In structure, pure or hyaline myxoma has its physiological prototype in the soft rudimentary connective tissue and enamel organ of the foetus, in the Whartonian jelly of the umbilical cord, and in the adult vitreous

FIG. 36.



Hyaline Myxoma, showing the characteristic anastomosing stellate and spindle cells, as well as round cells, which are contained in the meshes of a vascular network. The nuclei in the walls of the vessels are very apparent.  $\times 400$ .

body. It consists, as is represented in Fig. 36, from Billroth, of a meshwork of vessels, the spaces between which are filled with a mucous substance beset with round and oval, but more especially with spindle and stellate, cells, from which numerous filamentous and anastomosing processes or prolongations are given off. Tumors thus constituted have a translucent, greenish, yellowish, or yellowish-gray color, are of soft, jelly-like consistence, and yield, on pressure or scraping, a clear, sticky, viscid, or filamentous fluid, similar to a solution of gum arabic, and exhibiting the chemical characters of mucin.

From this simple type of structure there are certain devi-

ations, through which are constituted the following varieties :

*a. Medullary Myxoma.*—When the cells—which, compared with the intercellular substance, are usually few in number—proliferate and preponderate either throughout the entire mass or at localized points, and the tissue has a whitish, opaque, or even an encephaloid, appearance, the term medullary is prefixed to the growth.

*β. Lipomatous Myxoma.*—When, on the other hand, without having necessarily multiplied, the cells are converted into fat cells, and the gelatinous material contains firmer areas of a yellow, yellowish-white, or brownish-white tint, the tumor is known as lipomatous myxoma.

*γ. Fibrous Myxoma.*—If the mucoid intercellular substance is pervaded by rather abundant ordinary connective tissue and elastic fibres

in the form of delicate bands or meshes, the neoplasm is converted into a fibrous myxoma, which has a grayish or whitish tint, is tolerably firm, and is not unlike œdematous areolar fibroma.

δ. *Cystoid Myxoma*.—If, as occasionally happens, the cells themselves undergo mucoid transformation and disintegrate, and the matrix liquefies, cystoid spaces filled with less consistent mucoid fluid result, and change the growth into a cystoid myxoma.

ε. *Telangiectatic Myxoma*.—Any of these varieties may become so vascular through the new formation of vessels as to constitute telangiectatic myxoma, or, in the event of the rupture of the delicate and enlarged vessels and interstitial bleeding, hemorrhagic myxoma. These occurrences are denoted by the rosaceous, red, dark-red, or brownish-red discoloration, and even by vessels which are visible to the naked eye.

Hyaline myxoma constitutes the most common variety. Of 9 examples in which the minute features are described, 2 were hyaline, 1 was hyaline and fibrous, and 1 was hyaline and hemorrhagic; 2 were lipomatous, and 2 telangiectatic and lipomatous; while 1 was fibrous and telangiectatic. Hence the hyaline, fatty, and vascular varieties constitute the majority.

Like the other histoid neoplasms, myxoma originates in the interlobular and intertubular connective tissue, which, from being dense and resisting, reverts to its rudimentary or mucous state. Just how often the adipose tissue of the gland serves as its starting-point it is, of course, impossible to say; but a case recorded by Moore, in which a portion of the tumor consisted of almost pure fat, appears to favor the idea that the primary growth was of that nature, and that the fat cells had returned to their embryonic condition.

The entire mamma may be converted into a bulky mass, or one or more lobules may alone be concerned in the tumor formation, thereby constituting diffused and lobular, or circumscribed, myxomata. The latter are the more frequent, as limited portions of the gland were affected in ten of the fourteen instances<sup>1</sup> which I have collated. In one of these, as occurs also in fibroma and sarcoma, the growth, which was as large as an orange, displaced the gland backward, but was attached to it by a pedicle of the thickness of two fingers. In the remainder the tumor was merely encapsuled, without being fixed to the mamma. In both forms the lacteal glands usually disappear; but in one-half of all examples the dilated ducts are filled with vegetations,

<sup>1</sup> The cases are recorded by De Morgan, *Trans. Path. Soc. London*, vol. xx. p. 360; Cooke, *ibid.*, vol. xix. p. 398; four by Péan, *De la Forceipressure*, p. 41, and *Leçons de Clinique chir.*, t. i. p. 478, and t. iii. p. 724; Labbé and Coyne, *op. cit.*, pp. 322 and 326; Moore, *Dublin Journ. of Med. Science*, vol. lxiii. p. 489; Virchow, *op. cit.*, p. 427; Cornil and Ranvier, *op. cit.*, p. 1162; Jüngst, *Virchow's Archiv*, Bd. xev. p. 195; Parker, *Trans. Path. Soc. London*, vol. xxxii. p. 237; Terrillon, *Le Progrès médical*, March 6, 1886, p. 188; and Barton, personal communication.

and constitute the intracanalicular, papillary, or vegetating variety of myxoma.

Mucous tumors are solitary, round, or ovoid, occasionally nodular or lobulated, and are usually seated in the upper hemisphere of the breast and toward its outer periphery. They are quite liable to inflammation, ulceration, and fungous protrusion, as those accidents were met with in three of the twelve examples in which the histories are complete. In one of Péan's cases the tumor, which had existed for fourteen years in a woman aged fifty-five, had been the seat of a superficial abscess for six weeks. In one described by Labbé and Coyne the intracanalicular growth protruded through an opening in the skin in the form of a bleeding black mass, and was the seat of an occasional slight hemorrhage. In this instance the ulceration was due to specific infiltration of the skin, as the papillæ were much enlarged and composed of myxomatous tissue. In the case of telangiectatic lipomatous tumor recorded by Moore ulceration ensued in five years, and the patient nearly bled to death. During the last twelve months of its existence it bled at each menstrual period, and the hemorrhage was quite profuse, and it discharged gelatinous material for one month before its removal.

Myxomata develop as early as the twenty-ninth and as late as the fifty-sixth year, the average being forty-four years and a quarter. Of 12 cases in which the age is noted,

1	appeared between 20 and 29 years.
2	" " 30 " 39 "
6	" " 40 " 49 "
3	" " 50 " 59 "

Hence, as three-fourths of the entire number appear during the functional decline of the mamma, their evolution, like that of carcinoma, is intimately connected with the period of obsolescence of the breast, or when the glandular structure is disappearing and the fibrous and fatty constituents predominate.

Six of the women, of whom two were sterile, one had one child, and three were multiparous, were married, and two were single, the social condition not being noted in the remainder. In one the tumor appeared seven years after the menopause, which occurred at the age of forty-seven; in one at the seventh month of the first pregnancy, and the menses were regular; while in one the catamenia were irregular at the age of forty-nine. In not a single instance was the manifestation of the growth referable to trauma or heredity.

Myxomata increase more rapidly than fibromata, but less swiftly than sarcomata, although their volume is never so great as is met with in those neoplasms. Even when the entire gland is involved, it is unusual for them to attain the size of a child's head, as in the tumor depicted by

Virchow. In a general way, it may be said that they grow rapidly, since, with the exception of two which had acquired, respectively, the volume of a walnut in six months and of an almond in three years, none are recorded of less size than an egg, an apple, or an orange within the first year of their existence, while one measured three inches and a half by two inches and a quarter in that time. In the case of Moore a weight of upward of five pounds was reached in six years, while in that recorded by Jüngst the size of a man's fist was attained in ten years.

In one-half of all cases pain of an intermittent lancinating nature was met with. In three-fourths of these it was first experienced during the rapid increase of the tumor, while in the remaining fourth attention was called to the growth by the suffering. In one of these cases the tumor presented all the characters of the so-called irritable tumor of the breast.

While myxomata evince no disposition whatever to extend to the deeper structures, they invade the skin in one-half of all instances, as was shown by its positive infiltration in two cases, and by discoloration and adhesion in four. Among these six examples ulceration had also occurred in three. Enlargement—without, however, induration—of the associated lymphatic glands was observed in only one of the twelve cases in which the symptoms are detailed, but, as they were not interfered with, and as the further history of the case after operation is incomplete, it is impossible to say what changes they had undergone.

Of the natural course of myxoma nothing is known, as all the cases were subjected to the knife. Of twelve examples, in which there are more or less finished accounts, one died from the effects of the operation, the tumor having existed for one year; one was well two months subsequently, and the growth was of twelve months' duration; four were well, without recurrence, at the end, respectively, of twelve, eighteen, twenty-six, and twenty-six months; one recurred in fifteen months, and was still living three years and a half from the first appearance of the disease; while five were devoid of further histories, but in these the disease had existed, respectively, six months, twelve months, three years, six years, and fourteen years before removal. In these twelve examples the duration of life, from the first observation of the disease until its termination in recovery or death, varied from six months to fourteen years, and averaged fifty-seven months. Excluding the cases in which death ensued from the operation and the history terminates with recovery from operation, there was one recurrence out of six operations. Hence, it may be said that myxomata are tumors of limited malignity, as they recur in 16.66 per cent. of all instances, but do not occasion metastatic deposits.<sup>1</sup>

<sup>1</sup> As has just been stated, myxoma of the mammary gland, although it recurs after



The clinical features of mucous tumor are by no means characteristic. The great softness and frequent sensation of fluctuation, which distinguish it in other situations, and through which it is liable to be confounded with fatty and cystic growths, are absent in the majority of cases in this locality. Of the eight examples in which the consistence is noted, in only two was it soft; in one it simulated a cyst with thickened walls or had a doughy feel circumscribed by a firmer sensation; while in five it was more or less hard. In one-half of all instances the skin is adherent, discolored, and infiltrated, while in one-fourth it is ulcerated. The axillary glands are enlarged in one case out of every twelve, but the nipple and veins are normal and the tumor is mobile on the chest. In one-half of the cases the patient experiences pain of an intermittent, lancinating character.

Some of these signs, when considered in connection with the mature age at which the growth usually develops, tend to render the diagnosis most obscure. Thus, in the case of De Morgan, which occurred at the age of fifty-six, the enlarged axillary glands, slightly adherent skin, and firm feel of the tumor caused it to simulate carcinoma.

On the whole, a solitary, rapidly and continuously growing, although not bulky, round or ovoid, painful, soft or rather firm tumor, with limited attachment to the skin, but movable on the deeper structures, with a tendency to ulcerate, and, it may be, to discharge a gelatinous material, but unattended with enlargement of the glands or superficial veins, or retraction of, or discharge from, the nipple, and occurring at about the forty-fourth year, may be assumed to be a myxoma.

operation in one-sixth of all instances, does not extend to the walls of the chest or occasion metastatic tumors of the viscera. The paramammary form, or that which starts in the coverings of the gland, is eminently malignant. Thus, Virchow<sup>1</sup> records one which developed upon the breast from a wart at the side of the nipple at the age of nineteen, and in two years formed a polypoid tumor of the volume of an infant's fist; but further details are wanting. Of the four that started in the subcutaneous fat, that of Neumann<sup>2</sup> recurred twice, and the pectoral muscle was the seat of small tubers; that of Péan<sup>3</sup> recurred four times, and the axillary glands were voluminous, but the patient remained well ten months after the last operation; that of Forster<sup>4</sup> invaded the mamma and recurred in two months, and, on death eight weeks later, the muscles of the chest were involved, but the viscera were sound; while in that of Morris<sup>5</sup> there was one recurrence, and, on death in eighteen months from the first observation of the disease, the posterior part of the right lobe of the liver was found to be transformed into a myxomatous mass, as large as a foetal head at full term, which invaded the base of the contiguous lung. Hence of the four cases of paramammary myxoma in which there is a further history after operation, all recurred, and one reproduced itself in the liver.

<sup>1</sup> *Op. cit.*, p. 419.

<sup>2</sup> *Virchow's Archiv*, Bd xxiv. p. 316.

<sup>3</sup> *Leçons*, etc., ante, p. 478.

<sup>4</sup> *Trans. Path. Soc. London*. vol. xxiii. p. 260, and *Guy's Hosp. Rep.*, ser. 3, vol. xviii. p. 48.

<sup>5</sup> *Ibid.*, vol. xxiii. p. 274, and vol. xxiv. p. 120.

The treatment of myxoma differs in no wise from that of sarcoma. On account of its recurring character, enucleation of the tumor should not be resorted to.

### ADENOMA.

In the connective tissue neoplasms of the mamma, as I have already pointed out, the glandular apparatus is liable to persist and undergo certain changes, such as enlargement of the acini and ducts and irritative hyperplasia of the epithelium—alterations which so thoroughly impressed the older writers with the idea that they were the essential elements as to lead them to regard the tumors in which they were found as being composed of glands of new formation, and to lose sight of the stroma as their possible matrix tissue. Hence, under the term adenoma or some of its antiquated synonyms, as *tumeur adénôïde*, *hypertrophie partielle*, *adenocèle*, *lobular imperfect hypertrophy*, or *mammary glandular tumor*, Birkett, Broca, Velpeau, Lebert, Bryant, and Paget, and more recently Cadiat and Lannelongue, describe growths which they regarded as being true adenoma, but which differ from that neoplasm in their genesis, intimate nature, and clinical features, and which are composed, for the most part, of transformed preëxisting lacteal glands contained, but widely separated, in a fibrous stroma.

With the exception of myxoma, there is not a single neoplasm which is so uncommon as genuine adenoma, since it was met with, as I have already pointed out, only 3 times out of 995 tumors of the breast. I have examined and described four specimens<sup>1</sup> from the practice of other surgeons, and reported a case of my own, and have collated nineteen additional examples, which serve as the materials at my disposal for writing the life-history and histology of this little understood formation.

The physiological type of adenoma is to be found in a mamma preparing for lactation. During the first pregnancy, and toward its termination, the glandular structure proliferates, through which there is a new growth of acini and ducts throughout the organ; these are contained in a vascular, succulent, loose, and comparatively sparse connective tissue, which is, moreover, rich in cellular elements. Pathologically, a new formation of lacteal glands takes place through a process of budding and extension into the proportionately scant interstitial stroma, so that they preponderate, and represent a simple hyperplasia of the glands as a whole, and not merely of their investing epithelium, as is taught by most authors. These points

<sup>1</sup> *Amer. Journ. Med. Sciences*, Oct., 1879, p. 459, and *Philada. Med. Times*, Jan. 31, 1880, p. 218.

are beautifully shown in Fig. 37, which represents the development of adenoma. All of the acini of a lobule are dilated, so that, instead

FIG. 37.



Development of Adenoma.<sup>1</sup> Dilated and cystic lobule, \*, giving off nine prolongations in the form of tubes lined by columnar epithelium, which pursue, as a rule, a parallel course, but now and then divide and anastomose with one another and with offshoots from other lobules, one of which is partially represented at \*\*. The majority preserved their lumen throughout, although they frequently terminated in attenuated, solid, cellular processes, which sometimes were turned upon themselves. The intertubular young connective tissue was so very scanty that, on transverse section, many of the closely crowded tubules appeared to be separated merely by their adventitia.  $\times 100$ .

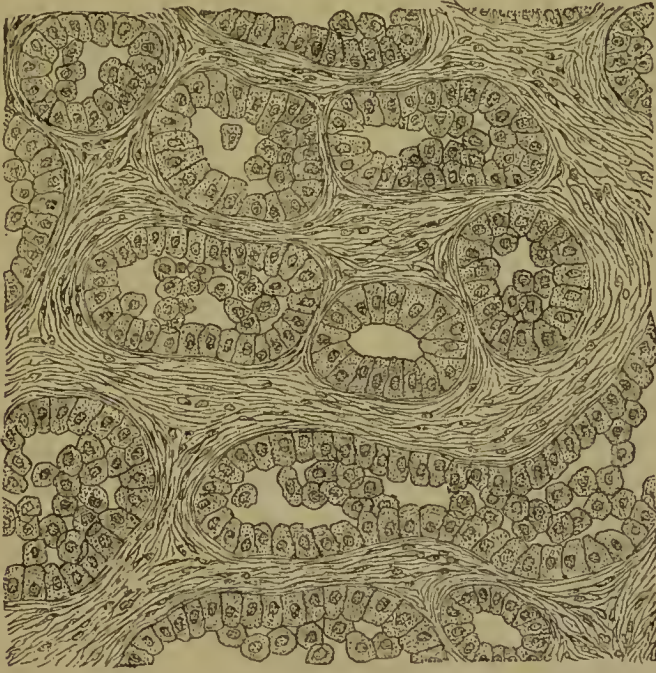
of having a clustered form, the lobule is converted into an irregular cavity, and sends off numerous intercommunicating prolongations or

<sup>1</sup> From a section of an ulcerated and fungating, moderately soft, somewhat lobulated tumor, of the volume of a child's head, of eighteen years' duration, from a spinster fifty years of age, which was removed by Dr. Morton at the Pennsylvania Hospital. It had been stationary for the first eight years, when it began to increase, and at the expiration of twelve months burst and discharged a bloody fluid, when it apparently disappeared. At the end of four months another nodule manifested itself immedi-



hollow cylinders or tubes into the surrounding connective tissue. A neoplasm which presents a likeness to the mamma of a female advanced in gestation may be styled a typical adenoma, as is represented in Fig. 38, from Formad, but it is only a partial likeness, as the

FIG. 38.



Adenoma, showing a transverse section of newly-formed glandular tissue, contained in a relatively sparse fibrous stroma.  $\times 200$ .

efforts of nature appear to be confined to the excessive production of glandular apparatus, without attempting to unite the acini into distinct lobules attached to excretory ducts. The criterion of adenoma is the presence of the *membrana propria*, which separates the investing epithelium from the surrounding connective. When it is broken through, and the epithelium grows as solid plugs into the lymph spaces of the stroma, the tumor ceases to be an adenoma and becomes a carcinoma.

From the marked tendency which adenoma has to undergo cystic changes, it usually presents itself as an atypical growth which is characterized by alterations in the shape, dimensions, and grouping of the

ately below the site of the previous one, which, in its turn, at the expiration of two years and a half, opened, and was the seat of a constant discharge, which latterly was profuse, offensive, and bloody. The nipple was retracted, but the axillary glands were normal. After removal, the surface of the growth was uneven and nodular from underlying cysts, which were filled with blood, and the skin toward its base had a purplish tint. The fungus had a breadth of six inches, and the numerous cysts varied in size from a pin's head to a small egg, and possessed thin and blood-stained walls.



enlarged and deformed glands, but in which the *membrana propria* is preserved. Thus, twelve years ago I removed from the upper and inner circumference of the breast of a prolific married woman, forty-six years of age, a tumor of three years' duration, which was hard, perfectly mobile, bossed, almost spherical, of the volume of a walnut, and unattended with pain, tenderness, or changes in the skin, nipple, veins, or axillary glands. On section, the white, but here and there rosaceous white, basis was dotted, but not to any considerable extent, with cavities, of which none were larger than a small pea, which were filled with a yellowish pultaceous or atheromatous material that could be expressed as plugs. Under the microscope the greatly enlarged acini were seen to be packed, for the most part, with large, round, angular, elongated, and polyhedral cells, which had undergone fatty degeneration in the centre of the largest acini. The connective tissue was present in much less abundance than I have ever witnessed it in a lactating mamma, and it was in parts the seat of small-celled infiltration. Although the dilatation of the acini was similar to that of the secreting breast, the atypical grouping of the large and deformed cells served to distinguish the structure from that of the functionally active mamma, while from the presence of the atheromatous moulds and the exclusive enlargement of the acini the tumor is to be classed as a cystic acinous adenoma, the contents of the cavities being due to caseation of the epithelium.

As I have just pointed out, adenomata are usually composed of enlarged acini, although they may be constituted mainly of newly-formed ducts. When the acini predominate, they may be termed acinous, while they may be called tubular when the ducts preponderate. Of the entire number, six-tenths were cystic acinous growths, of which 85 per cent. were cystic. Hence it appears that pure adenoma is very uncommon, while the cystic acinous variety constitutes the majority.

Adenoma differs from all other neoplasms of the mamma through its wonderful tendency to become cystic, twenty-two of the entire number having undergone that transformation. The contents of the cysts may be fluid or semifluid, and are due to changes which ensue in the proliferating epithelium. In the former event—and ordinary fluid cysts were seen in 44 per cent. of all examples—the secretion may be lactescent, or it may be sanguinolent from the presence of vascular vegetations, or even with the absence of very large vegetations. When the cells undergo advanced fatty changes, as happened in 50 per cent. of all instances, the contents are of a rather dense caseous or atheromatous nature; but the cavities are usually minute, and never attain the volume of an egg, as is witnessed when the contents are fluid. Their size, indeed, rarely exceeds that of a hazelnut, and the

larger cavities are usually formed by the confluence or breaking down of contiguous ones. In 28 per cent. of the specimens the lining epithelium was proliferating to form microscopic intraacinous vegetations or papillæ, which were purely epithelial in their composition when they were small, but were made up of delicate vascular connective tissue, clad with columnar epithelium, when they completely filled the acini.

With the exception of cystic changes, adenoma does not appear to undergo other degenerations, unless it be the telangiectatic and the myxomatous, both of which are very uncommon. It is, however, rather liable to spontaneous ulceration, as that accident was met with in five instances, and it was threatened in a sixth case. In another case the tumor protruded fungous vegetations as a result of injections of carbolic acid, and in still another the fungus was excited by lancing.

Adenoma is usually ovoid, and invariably bossed or nodulated in outline, but not largely so, and of a hard resistant consistence, although when decidedly cystic it may be uniformly soft and elastic, or, as more often happens, hard, except at the larger bosses, over which it fluctuates. Although it is limited by a distinct fibrous capsule, it is, when of moderate volume, closely and broadly united to or incorporated with the mamma, but its attachment is less conspicuous as it increases in bulk. On section the cut surfaces are smooth, lobed, of a milky-white color, with possibly rosaceous areas, and dotted with orifices or small cavities, to which, after the expression of their contents, is imparted a spongy, honeycomb, or sieve-like appearance. They are frequently occupied by fluid cysts, which, however, rarely number more than three or four, are usually quite small, and rarely exceed the volume of a walnut. They are never pervaded by fissures or slits, nor are they the seat of dilated ducts with intracanalicular solid growths, such as are witnessed in the connective tissue neoplasms, or of yellowish lines or spots, such as are seen in carcinoma.

With a single exception, adenoma was always met with as a solitary tumor, which generally originated toward the upper and inner circumference of the mamma, being found either beneath or in the vicinity of the nipple in only one-third of all instances. It develops as early as the sixteenth and as late as the sixtieth year, the average age of its first observation being thirty-three years. Of 23 examples in which the age is recorded,

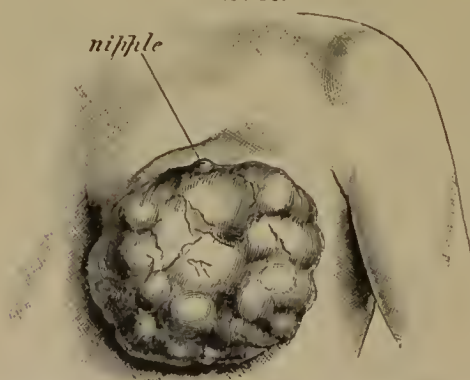
4 appeared between 10 and 19 years.					
6	"	"	20	"	29 "
6	"	"	30	"	39 "
5	"	"	40	"	49 "
1	"	"	50	"	59 "
1	"	at		60	"

Of the entire number, not a single one occurred before the sixteenth year, or during the developmental state of the mamma; 16, or 69.56 per cent., appeared previous to the fortieth year, or during the period of the greatest functional activity of the breast; and 7, or 30.44 per cent., after that age or during the functional decline of the gland. 16 of the patients were married when the tumor was first detected, 5 were single, and in 3 the social condition is not stated. Of the married women, 7 were multiparous, 3 had one child, 4 were barren, and the question of children is not mentioned in 2. In none did the neoplasm originate during lactation. With two exceptions, the menstrual discharge was regular in all of the cases in which that function is noted. In one instance the disease was presumed to depend upon a puncture by a needle, and in two upon a blow; in none was it traceable to hereditary influence; in one it was preceded by eczema of, and a milky discharge from, the nipple on the removal of the crusts, which had, however, ceased for nine years; and in one by mammary abscess. The general health of the subjects was excellent.

The increase of adenoma is, upon the whole, less rapid than that of any other of the neoplasms of the breast, and is not influenced by lactation or uterine disorders, although it grew rapidly during pregnancy in two of the twenty-two cases in which the histories are complete. In my own case the tumor attained the volume of a walnut in three years, but it may grow to the same dimensions in three months; and in three cases it was as large as a hen's egg in two, six, and twelve months. Certain writers state that it does not exceed the latter volume, but it may reach the size of a fist in two, five, fifteen, or thirty-six years, or of a child's head in ten months, twenty-three months, or eighteen years, or of an adult head in twelve years. Hence the rate of growth is very variable, but the mode of growth is peculiar in being equable and uninterrupted. As a rule, the increase is so slow that many years may elapse before the tumor attains even a moderate bulk. Thus, in two cases it was scarcely

appreciable for, respectively, seven and ten years, while in another it was so excessively gradual that the almond-sized nodule required thirty-three years to reach the volume of an egg, after which it took on so rapid a growth that in three years it equalled the dimensions of a fist. The mode of increase appears also to be singular in that it goes on by the apposition of new nodules to the original

FIG. 39.



Solid Adenoma, showing its lobulated outline.

tuber: this is due to the successive involvement of contiguous nodules, through which the entire mamma may be converted into a bossed or lobulated tumor, as is shown in Fig. 39, from Bryant.

During its further progress adenoma evinces certain signs which, if they are not carefully studied, render it liable to be confounded with sarcoma and carcinoma. Thus, out of the 22 cases in which the histories are complete, the subcutaneous veins were prominent in 3; the skin was discolored in 4, and it was adherent in 6; the nipple was sunken, rather than retracted, in 4, and a bloody or lactescent discharge from that body preceded the detection of the tumor in 4, and could be expressed in 1; ulceration occurred late in the disease in 5; and in 3 of these a red, vegetating, and bleeding fungus protruded through, without being attached to the margins of, the ulcer; and in 2 the axillary glands were enlarged from irritative hyperplasia. In one-half of all cases there is absolute freedom from pain; in one-third of the remainder the suffering is moderate; while in two-thirds the pain is severe and lancinating, especially when the growth has been rapid and the patient is pregnant.

Our knowledge of the prognosis of adenoma is unsatisfactory. In one of Fochier's<sup>1</sup> patients, the parts were perfectly sound six months after operation. In the case of Peter<sup>2</sup> there was no return in twenty-eight months, and in that of Sloan<sup>2</sup> the woman was free from recurrence at the end of two years. Billroth's<sup>3</sup> patient remained well for fourteen years after the enucleation of a tubular adenoma, as did the cases of Heineke,<sup>4</sup> Winekel,<sup>5</sup> and Rushton Parker,<sup>6</sup> respectively, for thirty months, five years, and nine years and two months. In a second case of Winekel's it is stated that the patient remained well, but dates are not given. In one of Labbé's<sup>7</sup> cases local recurrence and enlargement of the axillary glands occurred in less than twelve months, and death ensued at the expiration of three years after the removal of the entire breast, but there was no post-mortem inspection of the body. The disease reproduced itself in the ciatrix in seven months after extirpation of the entire mamma of the patient of Stendener,<sup>8</sup> but she was well thirty-one months after its removal. Of the remaining 14, 2 are entirely devoid of a history of the termination, while 9 recovered from operation and 3 died from its effects. Hence adenoma recurs in 20 per cent. of all cases after operation, but there is no evidence to show that it infects distant organs. The relatively benign nature of the disease is, moreover, demonstrated by the fact that it had existed, on an average, seven years before extirpation, without affecting the general health.

<sup>1</sup> *Lyon médicale*, vol. xiv. p. 142.

<sup>3</sup> *Op. cit.*, p. 80.

<sup>5</sup> *Op. cit.*, p. 751.

<sup>7</sup> *Op. cit.*, p. 352.

<sup>2</sup> *Philada. Med. Times*, Jan. 31, 1880, p. 218.

<sup>4</sup> *Op. cit.*, p. 1.

<sup>6</sup> *Trans. Path. Soc. London*, vol. xxxii. p. 237.

<sup>8</sup> *Virchow's Archiv*, Bd. xlv. p. 42.



One case, indeed, was of nine, one of twelve, one of fifteen, two of eighteen, and one of thirty-six years' standing.

A small adenoma is very liable to be confounded with a small fibroma, but the latter is more distinctly circumscribed and isolable, and far more mobile in or upon the mamma, and its outline is not so decidedly bossed. Upon the whole, the diagnosis of adenoma is based upon its hard and heavy feel, its nodular outline, its pretty intimate attachment to the breast when of moderate volume, its mobility upon the chest, its slow and equable growth, its increase by the addition of small, compact nodules, its occurrence in married and prolific women toward the thirty-third year, the limited discoloration and adhesion of the skin and ulceration late in the disease, and freedom from retraction of the nipple, enlargement of the subcutaneous veins, and involvement of the lymphatic glands. If a tumor which presents these features has been preceded by a discharge from the nipple, there should be little difficulty in arriving at a correct conclusion as to its true nature.

The treatment of adenoma is by enucleation of the small, and removal of the breast for the larger growths, especially if they be ulcerated.

### CARCINOMA.

The term carcinoma, which is synonymous with carcinomatous epithelioma and cancer,<sup>1</sup> is applied to an infiltrating atypical epithelial new formation which is characterized, clinically, by local infection of the adjacent tissues and associated lymphatic glands and by a marked tendency to general dissemination. A tumor which comprises these malignant attributes consists, structurally, of a cavernous fibrous stroma or framework, the communicating meshes or alveoli of which are occupied by solid nests, plugs, or cylinders composed of loosely-heaped polymorphous epithelial cells suspended in a serous fluid, without the intervention of a cementing intercellular substance.

Although an alveolar fibrous stroma is so important a constituent of carcinoma that Cornil and Ranvier<sup>2</sup> declare that carcinoma should more appropriately be termed alveolar fibroma, it is not, of itself, any more than are the aggregations of cells, a sufficient basis for histological diagnosis. The stroma, which represents, partly, the original framework of the mamma, and, to a greater extent, newly formed connective tissue, is, as a rule, denser than that found in adenoma and sarcoma, but differs in structure and abundance in the varieties of carcinoma. Many of the

<sup>1</sup> The word cancer is employed by the majority of English writers as the equivalent of malignant; but it is used here, interchangeably with carcinoma, to express anatomical, and not clinical, features. There are other tumors of the breast which are quite as malignant as carcinoma or cancer, but which present no structural likeness whatever to it.

<sup>2</sup> *Op. cit.*, p. 111.

alveoli of the latter are, unlike those in adenoma and sarcoma, lined by the endothelial cells of the lymph spaces into which the carcinomatous plugs have grown. The cells, moreover, differ in their vital qualities and chemical properties from normal epithelial cells. They are enlarged and deformed, may possess multiple nuclei, and are very prone to undergo fatty degeneration. Hence, the determination of carcinoma depends upon the combined characters of the cells and stroma and their mutual arrangement.

The histogenesis of cancer is still the subject of dispute; but I am convinced, from examinations of numerous sections of nearly two hundred specimens, that the exclusive view of Waldeyer<sup>1</sup> as to its derivation from the glandular apparatus is correct. Thus, in sections made from the peripheral or developing zone, the acini, and occasionally the ducts, are seen to be enlarged, deformed, and more or less completely filled with proliferating epithelium, and to be surrounded by the membrana

FIG. 40.



Development of Carcinoma: *a, b, c*, enlarged acini, more or less closely packed with polymorphous cells, the undermost layer of which is columnar. At *b* the membrana propria is intact, while at *a* and *c*, below and to the right, it has disappeared and the cells are extending into the stroma. The connective tissue framework is pervaded by variously shaped, simple or branched, solid cell cylinders, which are the outgrowths of other acini. The cells themselves are merely indicated by their stained nuclei.  $\times 180$ , reduced one-half.

propria. The periacinous connective tissue is, at the same time, infiltrated by lymphoid cells, so that the entire picture resembles an irri-

<sup>1</sup> *Virchow's Archiv*, Bd. xli. p. 478.

tative or chronic inflammatory process, and is very similar to what I have already described as atypical adenoma. During the second stage the small-celled infiltrate leads to the new formation of connective tissue, while further alterations ensue in the shape of the acini, the epithelial cells change their characters, and the membrana propria disappears. In the final stage, or when the development is complete, the acini, as is represented in Fig. 40,<sup>1</sup> have extended or grown into the new connective tissue and the preëxisting lymph spaces as solid, round, oval, or branching cylinders, plugs, or bodies, whereby the normal appearance of the mammary gland is destroyed.

In none of the numerous sections which I have examined have I ever been able to detect the multiplication of the endothelial cells of the stroma; nor am I a believer in the transformation of the cells of other tissues or organs, in which secondary or metastatic tumors are found, by contact with the epithelial elements of the original growth through some mysterious "action de présence" or "spermatic influence." Although the tubers or nodules in the skin and pectoral muscle, which indicate regional dissemination, are mainly due to the extension of the disease by the lymphatic vessels, as has been demonstrated by Langhans,<sup>2</sup> Waldeyer,<sup>3</sup> and other observers, my own investigations have convinced me that infection also frequently takes place along the perivascular lymph sheaths, as is shown in Fig. 41,<sup>4</sup> in which the lymphatic sheaths of the bloodvessels are more or less closely packed with young epithelial elements, through which their lumen is frequently diminished or even obliterated.

Histologically, the varieties of carcinoma are determined by the relative proportion of the stroma and cells, by certain degenerations and transformations, and by the presence of cysts. The principal varieties are the fibrous, multicellular, colloid, and cystic, the pigmented form not having been met with in the female breast. In the fibrous variety the stroma preponderates, while in the multicellular the cells are in excess. Midway between these stands simple carcinoma, or the carcinoma fibrosomedulläre of Waldeyer, the proportion between the cells and stroma being about equal. The last, however, need not be sep-

<sup>1</sup> From a section of a scirrhus carcinoma of one year's duration, which was removed, along with the infected axillary glands, from a German fifty-nine years of age. The disease recurred in the axilla in five months. Nearly five months subsequently I removed the axillary growth, which was as large as an egg and was composed of sixteen glands. The history of the case may be found in the *Philada. Med. Times*, July 5, 1879, p. 484.

<sup>2</sup> *Arch. f. Gyn.*, Bd. viii. p. 181.

<sup>3</sup> *Virchow's Archiv*, Bd. xli. p. 485.

<sup>4</sup> From a section of a nodule of the pectoral muscle which I extirpated, on account of severe suffering, along with an atrophying scirrhus of fourteen years' duration, and a densely hard axillary glandular tumor, from a prolific married lady forty-five years of age. Her general health was excellent, and she still menstruated. The macroscopic features of the tumor of the mamma are represented in Fig. 56.

arated from the fibrous variety, which it simulates in all its characteristics. A sharp line, indeed, cannot be drawn between them. A can-

FIG. 41.



Extension of Carcinoma into the Great Pectoral Muscle. To the left of the figure is seen a transverse section of an artery, the upper portion of the lymph sheath of which is infiltrated by epithelial cells. The alveoli between the primary muscular fasciculi are due to the absorption or disappearance of the greater portion of the latter from the pressure exerted upon them by the accumulations of cells in the interfascicular connective tissue. At several points the muscle corpuscles are seen to be more abundant than is normal, but this is an irritative phenomenon, and there is no evidence that they participate in the carcinomatous degeneration. The nuclei of the cells alone are delineated.  $\times 300$ .

cer may not possess the same structure throughout, as one part may be of the nature of ordinary scirrhus, another resemble simple carcinoma, while still another presents the appearances of atrophying scirrhus.

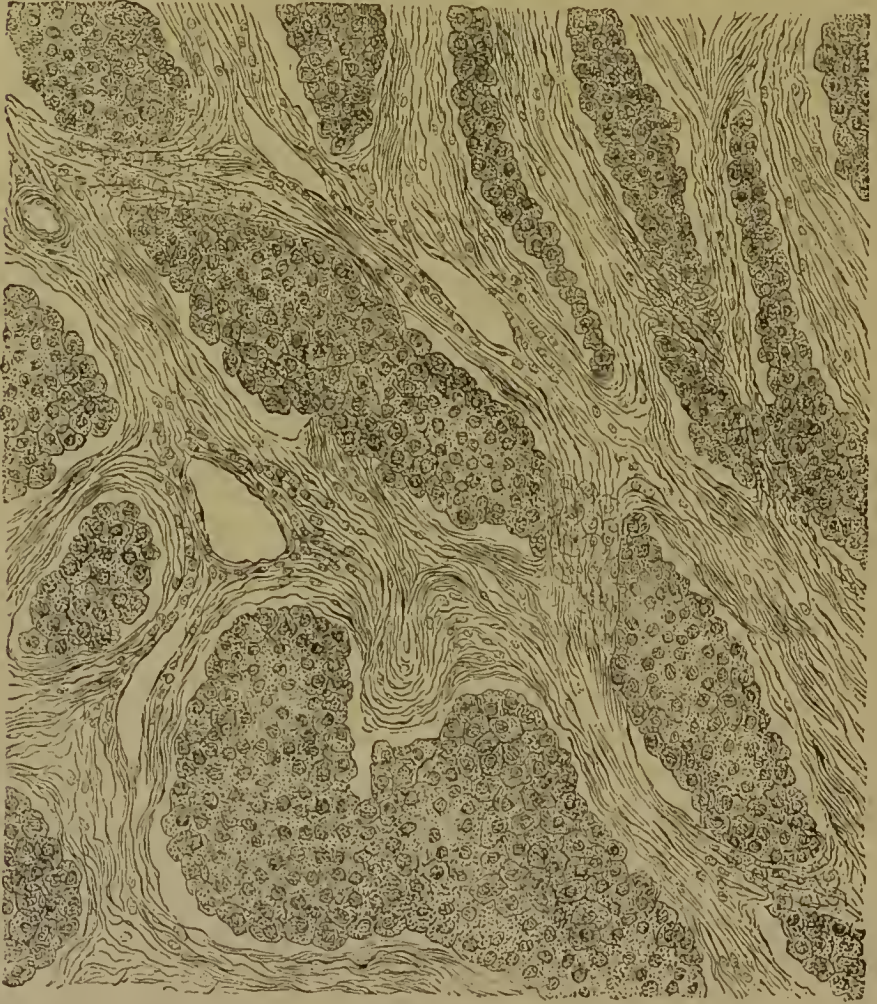
1. **FIBROUS OR CONNECTIVE TISSUE CARCINOMA**, which is equivalent to the tubular form of cancer of Billroth, the simple carcinoma of Foerster, and to the clinical terms scirrhus, hard, or chronic cancer, includes ordinary scirrhus and atrophying, retracting, withering, cicatrizing, or obsolescent scirrhus, as it is variously termed.

*a.* In fibrous or scirrhus carcinoma, as is shown in Fig. 42, from Formad, the stroma exists in about the same proportion, or slightly predominates over the collections of cells. The trabeculae of the former consist either of undulating connective tissue, which may be rich or poor in endothelial cells in accordance with the stage of their development,



or of a nonnodulating, faintly fibrous, or entirely homogeneous and refracting tissue. The cells contained in the alveoli do not attain the dimensions of those met with in encephaloid carcinoma, nor are they as liable to fatty degeneration.

FIG. 42.

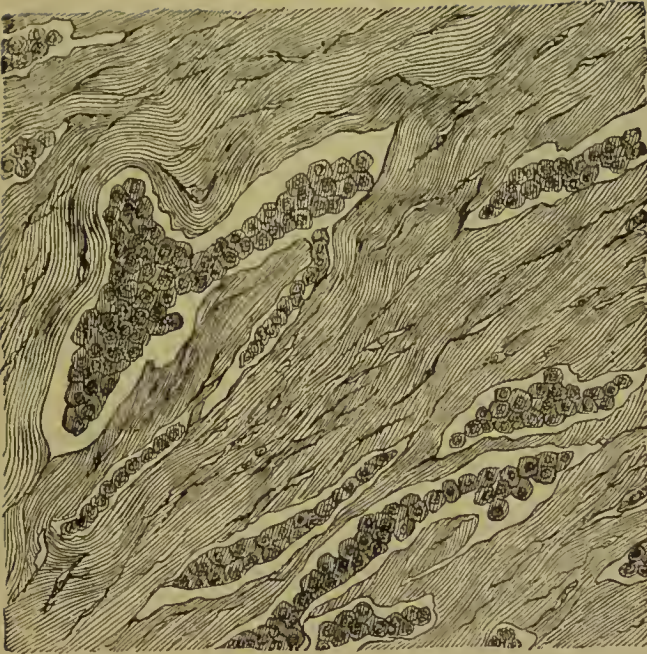


Scirrhus Carcinoma, showing the alveolar connective tissue framework loosely occupied by continuous epithelial plugs or cancer cylinders.  $\times 250$ .

$\beta$ . In atrophying scirrhus, which is called scirrhus by Billroth and the majority of German authors, the epithelial elements undergo fatty degeneration, whereby they are partly converted into a granular emulsion, which is absorbed, while the contracting stroma renders the alveoli smaller and narrower, as in Fig. 43, from Formad, which, in the more advanced stages, are merely represented by a few elongated or fusiform clefts, as in Fig. 44,<sup>1</sup> between the thick tendinous or sclerosed bands

<sup>1</sup> From a section through the centre of a greatly shrunken, discoid, and slightly

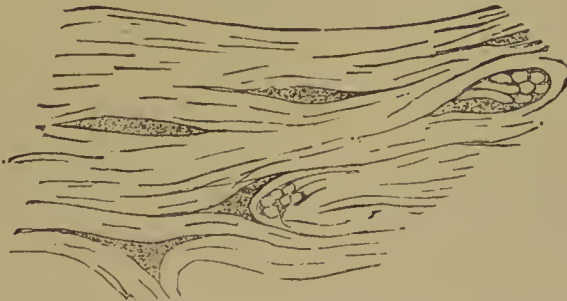
FIG. 43.



Atrophying Carcinoma, showing a dense fibrous stroma, which largely predominates over the cell cylinders, induces their atrophy, and leads to spurious cicatrization.  $\times 250$ .

of fibrous tissue, which contain fatty detritus, or, as is shown in Fig.

FIG. 44.



Atrophying Scirrhus, showing fatty remains of cells, which would not stain, contained in small spaces between thick bundles of fibrous tissue, transverse and oblique sections of which are represented at two points.  $\times 300$ .

45,<sup>1</sup> one or more rows of unchanged cells. Were it not for the fact ulcerated breast, which I removed after death, or seventeen years and a half from the first appearance of the growth, from a multiparous widow sixty-three years of age. The skin over the entire thoracic region was pervaded by secondary nodules; the opposite mamma and axillary glands were invaded; the pectoral muscles of the corresponding side were, for the most part, converted into densely hard carcinomatous material, and the axillary and supraclavicular glands were indurated and much enlarged. Both pleurae and both lungs, the bronchial and mediastinal glands, the opposite half of the diaphragm, and one kidney were the seat of metastatic tumors.

<sup>1</sup> From a section near the advancing margin of a tumor of fourteen years' duration, the history of which is attached to Fig. 41.

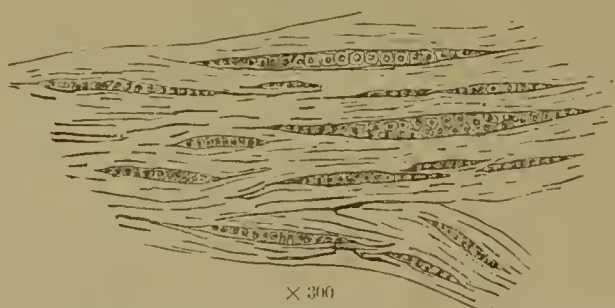


that the peripheral zones of the growth disclose the usual structure of scirrhous, atrophying carcinoma might readily be confounded with contracting fibroma.

2. **MULTICELLULAR CARCINOMA** is synonymous with the acinous carcinoma of Billroth and the tuberous, medullary, encephaloid, soft, or acute cancer of the clinician, and is characterized by the enormous production of the epithelial constituents, and the relatively small amount of the supporting connective tissue, through which the width of the alveoli is far greater than that of the trabeculae of fibrous tissue which form their walls, as is seen in Fig. 46, from Formad. The cells themselves are larger, and more liable to fatty changes, than those of any other form of carcinoma. The serous fluid in which they are contained forms an abundant milky juice containing cells, free nuclei, fatty detritus, and oil globules.

In four specimens which I examined the delicate trabeculae of the stroma were infiltrated by small cells in three, and composed of a

FIG. 45.



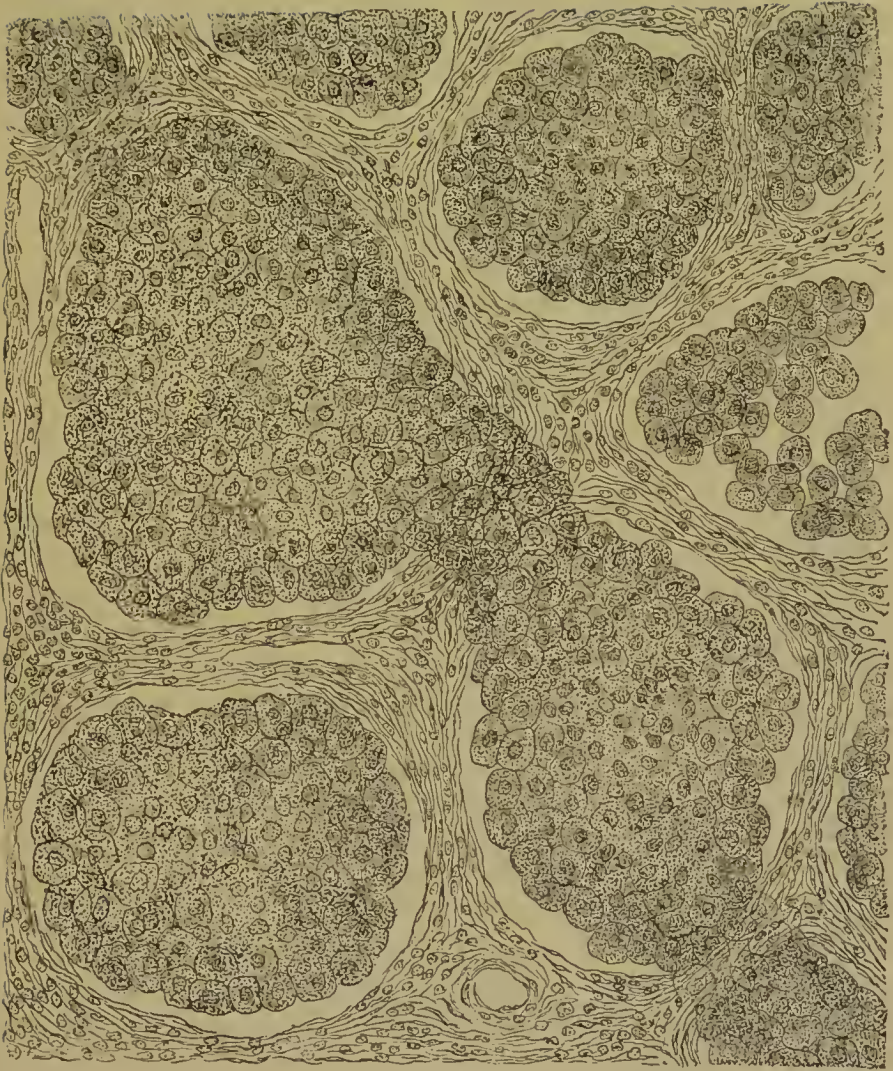
Atrophying Scirrhous, showing long spaces occupied, for the most part, by a single row of cells, and contained between thick bundles of fibrous tissue.

spindle-celled tissue in the other, so that it might with propriety be called a sarcomatous carcinoma. In other specimens the walls of the alveoli are constituted mainly by embryonic bloodvessels surrounded by a thin layer of soft connective tissue, giving rise to telangiectatic carcinoma, or fungus haematodes, as it is more commonly termed from its macroscopic features. It should be observed that medullary carcinoma is not always a soft tumor. When the cells have not undergone advanced fatty changes, so that the masses of cells distend the alveoli to the uttermost, it is firm and even hard. Under opposite circumstances, or when the cells have degenerated, and the tension of the alveoli is lessened or lost, the growth is soft and even pseudofluctuating.

3. **COLLOID CARCINOMA**.—Colloid, or gelatinous, carcinoma differs from the preceding varieties only in the fact that the protoplasm of its cells, and probably of its stroma, has undergone colloid degeneration.<sup>1</sup>

<sup>1</sup> Although Billroth, Wagner, Klebs, Waldeyer, and other pathologists teach that colloid cancer is merely an ordinary cancer in the highest stage of colloid metamor-

FIG. 46.



Encephaloid Carcinoma. The cancer cylinders are very large, and lie loose in the widely distended lymph spaces. The cells show a marked tendency to fatty degeneration, and the stroma is constituted by thin trabeculae of connective tissue infiltrated by leucocytes.  $\times 250$ .

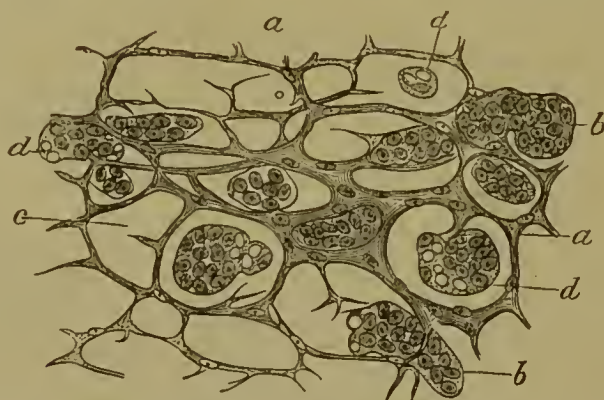
It is sometimes called mucous or alveolar cancer; but as the metamorphosis is not of a mucoid nature, and as all carcinomata are alveolar, these terms are misnomers.

A section of such a tumor discloses that, in its early stage, the heaps of cells are merely separated from the walls of the alveoli by a structureless colloid substance. As the transformation advances, the cells, some phosis of its cells, Virchow and Lebert hold that it depends upon the colloid character of its stroma; Foerster, Simmonds, and F. E. Schulze, upon colloid degeneration of both the cells and stroma; and Dontrelepont, with whom Rindfleisch appears to agree, upon colloid transformation of the amorphous formative or germinal material, out of which, under ordinary circumstances, the young cells of carcinoma are derived.



of which contain clear colloid globules, as in Fig. 47, from Ziegler, are massed toward the centre of the greatly enlarged alveoli and sur-

FIG. 47.



Colloid Carcinoma, showing stroma, *a*; cell nests, *b*; empty alveoli, *c*; and cells containing globules of colloid substance, *d*.  $\times 250$ .

rounded by the colloid material, which is marked by concentric circles or layers of dotted lines, as in Fig. 48, from Butlin, the dots representing the nuclei and granular remains of the cells that have been successively invaded by the change. With the still further advance of the metamorphosis the cells disappear entirely, and nothing remains save the lamination or concentric stratification of the homogeneous substance, surrounded by the trabeculae of the stroma. In none of the accounts of colloid carcinoma of the breast that I have examined have the cells assumed the handbox or oyster shell appearance that is met with in similar tumors of the other organs, so that the large, refractory, vesicular cells and the lamination are the most characteristic features of the neoplasm. In some cases, indeed, the cells were only the seat of fatty degeneration.

FIG. 48.



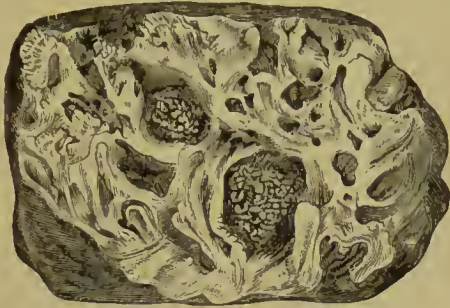
Colloid Carcinoma, showing group of cells, one of which contains colloid material, and faint linear markings between the cells and trabeculae of the stroma.  $\times 260$ .

4. CYSTIC CARCINOMA.—It sometimes happens, as in a case of my own, that the obstructed and dilated terminal acini and

ducts of mammae which are the seat of cancer are converted into cysts through mucoid or fatty transformation of their epithelium. In addition to these simple retention or involution cysts, that are combined with, although they precede the development of, carcinoma, cysts are

sometimes met with, as in Fig. 49, from a specimen in the Gross Museum, which are more or less completely filled with vascular, epi-

FIG. 49.



Cystic Encephaloid Carcinoma, showing, in addition to simple cysts, two cavities occupied by vegetations.

thelial clad vegetations or papillæ, which are merely protrusions of the periacinons connective tissue into their interior, and are themselves devoid of carcinomatous structure, although Bryant records a case in which the intracystic growths were carcinomatous.<sup>1</sup> Cornil and Ranvier<sup>2</sup> describe this proliferating form as villous carcinoma, while Nenmann<sup>3</sup> terms the case which he met with encysted medullary carcinoma. It is not, however, peculiar to soft carcinoma, as a specimen of scirrhus in the Gross Museum, a case of my own, and one recorded by Sprengel<sup>4</sup> show a similar combination; and Wood<sup>5</sup> reports an example of hard carcinoma of the male mamma in which the vegetations were so vascular as to convert the cavities containing them into blood cysts.

In addition to the preceding varieties we may have a myxomatous cancer through mucous transformation of the stroma, or a calcifying cancer through the deposition of the salts of lime in the alveoli and between the trabeculæ of the framework, as in the examples recorded by Aekerman<sup>6</sup> and Creighton;<sup>7</sup> or the fat cells of the stroma may preponderate to such an extent as to constitute a lipomatous carcinoma. These changes, are however, met with to so limited an extent that they can scarcely be said to constitute varieties, although, if it be deemed desirable to notice them, they may be retained as prefixes to indicate subordinate degenerations and transformations.

Besides colloid transformation and calcareous infiltration, carcinoma is excessively liable to fatty and granular degeneration of its cells, and less frequently to caseation through atrophy and desiccation of the fatty cells. These changes, which are indicated macroscopically

<sup>1</sup> *Guy's Hospital Reports*, vol. xliii. p. 479, Case 39.

<sup>2</sup> *Op. cit.*, p. 1167.

<sup>3</sup> *Virchow's Archiv*, Bd. xxiv. p. 319.

<sup>4</sup> *Langenbeck's Archiv*, Bd. xxvii. p. 805, Case 113.

<sup>5</sup> *Trans. Path. Soc. London*, vol. xxv. p. 223.

<sup>6</sup> *Virchow's Archiv*, Bd. xlv. p. 60.

<sup>7</sup> *Op. cit.*, p. 169.

by yellow or yellowish-white spots or streaks, constitute the regressive carcinoma of Heinrich Meckel or the reticular carcinoma of Johannes Müller; and they always precede the cicatricial formation met with in atrophying scirrhus. Cystoid spaces or cavities not infrequently result from interstitial hemorrhage and the disintegration of the cells, and the accumulation of a chocolate-colored fluid containing fatty detritus and cholesterin in the softened tumors, over which, if superficially seated, the discolored skin finally gives way. In the event of the bloodvessels of the stroma being attacked by fatty degeneration, these softening cysts also contain extravasated blood.

When cancer takes on rapid growth, and is attended by an extensive small-celled infiltration of its framework, it is prone to inflame, as is indicated clinically by increase of suffering, elevated temperature, and discoloration of the skin. Under these circumstances, and particularly when the tumor develops during pregnancy or lactation, an abscess may form at the expense of the infiltrated connective tissue, the epithelial cells themselves not participating in the morbid process. Even when the mamma is not functionally active, suppuration may ensue, as in the case of a married sterile woman, thirty-nine years of age, whose breast I extirpated in 1879. The tumor, which had acquired the volume of an egg in less than two months, contained an abscess as large as a filbert, filled with greenish pus.

The gross characters of the varieties of carcinoma correspond so closely to their minute features that the true nature of a specimen may be pretty accurately determined by its macroscopic appearances. Ordinary scirrhus, in which the stroma preponderates, has an irregular, rounded, nodular outline, and is frequently flattened or slightly cupped on its pectoral surface, so that it assumes a discoid shape. Its size is moderate, being usually not larger than a small lemon. Its consistence is densely hard and unyielding, and it is heavier than any other mammary neoplasm of equal volume. On section it is crisp and tough, and the cut surfaces contract and become concave, and exude, on pressure or scraping, a milky or turbid granular fluid or juice. The homogeneous, refracting, grayish-white surface is made up of interlacing bands, between which are intercalated yellowish-gray or yellow granular spots or dots and lines or stripes, which are indicative of fatty and caseous degeneration of the cells. At the periphery the section is also marked by pellets of normal fat, from their inclusion in the advancing infiltration. When the proportion between the cells and stroma is about equal the tumor has a bossed outline, and attains a much larger bulk, the volume of a large orange being not infrequent; or it may even measure between five and six inches in diameter, as happened in one of my cases. Its consistence is firm, rather than hard; its section is moderately tough, and the cut surfaces do not become concave. The



juice is more abundant and more grumous, and areas of caseation, softening, and increased vascularity are not uncommon.

Medullary carcinoma exhibits the same general characters as the more cellular form of scirrhus, although it is usually lobulated, and attains still larger dimensions, the volume of a child's head being quite frequent. Its consistence is generally soft and elastic, and even pseudo-fluctuating. The firm variety has a homogeneous white surface on section, while the soft form is made up of a grayish-white basis, mottled with pink, red, or brown areas, indicative of increased vascularity and slight effusions of blood. When the tissue resembles a recent coagulum or contains spaces filled with blood, the tumor is termed hæmatoid cancer, which is synonymous with fungus hæmatodes.

Atrophying scirrhus is the most dense, rigid, and inflexibly hard, and at the same time the smallest, of all the varieties. It creaks under the knife, and its cut surfaces are deeply concave, of a tendinous, glistening, bluish-gray lustre, and dotted here and there with pale-yellow granular spots. The juice, if any at all can be expressed, is of a thin and citron-colored serous nature.

Colloid carcinoma is, as a rule, as hard as ordinary scirrhus. Only one specimen in every twenty is soft, and it seldom attains larger dimensions than that variety, a volume of the fist being exceptional, and then only after a very chronic course. The cut surfaces are characterized by an exquisite alveolar structure, filled with a translucent or a cloudy-yellowish, yellowish-gray, or grayish-white, or possibly blood-stained, gelatinous substance.

In cystic carcinoma the cut surfaces are pervaded by cavities, which vary in size from a millet-seed to a walnut, and contain either fluid, caseous, or solid contents, the last being in the form of dendritic vegetations that impart to the section the appearance of a vegetating or proliferating fibroma or sarcoma. The basis of such tumors is usually composed of medullary tissue, although ordinary scirrhus carcinoma is not free from these changes.

As a class, the carcinomatous tumors may be distinguished from the noncarcinomatous by their inseparable connection with the breast, which they infiltrate, so that they are not provided with a limiting capsule; by their containing areas of fat; and by the absence of large intracanalicular vegetations, which are so common in the cystic variety of the latter growths. Scirrhus and atrophying scirrhus are also characterized by the concave appearance of their cut surfaces.

Of the relative frequency of the varieties of carcinoma, it may be said that out of every 100 cases we may expect to find ordinary scirrhus in 87.74 per cent., atrophying scirrhus in 7.92 per cent., encephaloid in 2.93 per cent., and colloid in 1.34 per cent. This statement is based upon 669 cases, including 164 of my own, in which the minute structure



is specified. Cystic carcinoma is so rare that I have met with it only once, and Henry, Hildebrand, and Sprengel each record 1 example, respectively, out of 192, 152, and 131 cases.

Carcinoma<sup>1</sup> never develops before puberty, and I have not seen it before the twenty-fifth year, although Henry reports a case at twenty-one, which is, if I do not mistake, the earliest that has been observed. It is very rare before thirty, after which age it gradually increases to between forty-five and fifty, when it reaches its maximum of frequency, 48.66 years being the average, and then decreases; it is very uncommon after seventy. Of 1622 cases in which the age is noted, the youngest was twenty-one, and the oldest eighty-four years.

37 first appeared between 20 and 29 years of age.						
268	"	"	"	30	"	39
605	"	"	"	40	"	49
488	"	"	"	50	"	59
199	"	"	"	60	"	69
24	"	"	"	70	"	79
1	"	"	"	80	"	89

Of the entire number, not one was observed during the developmental state of the mamma; 305, or 18.80 per cent., appeared during the period of its greatest activity, or up to the age of forty; and 1317, or 81.20 per cent., began after that age or during its functional decline.

Of 451 cases in which the catamenia are mentioned, 283, or 62.74 per cent., were menstruating at the date of the development of the disease, and only 8.45 per cent. of these were irregular in the performance of that function.

Of 1545 women in whom the social condition is noted, 1321, or 85.50 per cent., were or had been married, and 224, or 14.50 per cent., were single. Of 1034 in whom it is mentioned, 907, or 87.72 per cent., had borne children, and of these nine-tenths were multiparous; while 127, or 12.28 per cent., were barren. With regard to nursing, I find that, of 416 patients in whom it is referred to, 316, or 76 per cent., had suckled their infants, while 100, or 24 per cent., had not. In nearly 5 per cent. of the fertile women the disease developed during pregnancy or lactation.

The influence of the general health of the patients upon the development of carcinoma is not so marked as some authors teach. Thus, of

<sup>1</sup> The general pathology of carcinoma is based mainly upon an analysis of 1842 cases which have been reported within the past ten years. Of these Oldekop records 250 from Esmarch's clinic; Henry records 192 from the Breslau clinic; v. Winiwarter records 170 from Billroth's clinic; Hildebrand records 152 from König's clinic; Sprengel records 131 from Volkmann's clinic; Fischer records 63 from Rose's clinic; Kaeser records 70 from the clinic of Socin; Kuester, Heineke, Banks, Estlander, Riedel, and I record, respectively, 132, 130, 82, 59, 39, and 207, and 165 occurred in the Middlesex Hospital.

627 subjects in whom the point is noted, 417, or 66.50 per cent., were in excellent health; 129, or 20.57 per cent., were in indifferent or moderately good condition; and 81, or 12.92 per cent., were broken down from the effects of the disease. Hence, even when the patients first come under observation only one-third appear to be injuriously influenced by the progress of the affection; and it may be asserted that the nutrition of scarcely one in twenty suffers previous to sixteen months after the detection of the growth.

Among the profession, as well as the laity, the idea prevails that carcinoma is frequently inherited, but this view is not sustained by a careful analysis of the cases in which this point is mentioned. Thus, a family history of cancer is recorded in 99, or 8.50 per cent., of 1164 cases. A history of cancer in the relatives of cancerous patients does not, however, carry with it a history of inheritance of the disease, so that sisters, brothers, cousins, uncles, aunts, and other connections must be left out of consideration, and the inheritance be traced in the direct line of descent from parents, grandparents, and greatgrandparents. Looking at the subject from this standpoint, in only 55, or 4.72 per cent., of the 1164 cases can the disease be said to have been transmitted. In many of these cases, moreover, the history is based upon the mere statement or belief of the patient, and not supported by the evidence of those who have actual knowledge of the family history. In addition to these facts, the 55 cases demonstrate that the tumor was seated in the breasts of the ancestors in only 27, and that in 10 cases the lips, hand, nose, and œsophagus were the seat of epithelioma. In 3 instances the cancer is noted as being "internal," and in 2 others the seat is not given.

From the preceding data the conclusion is justified that the evidence of the inheritance of cancer is far from being satisfactory. Despite this conclusion, there can be no doubt of the hereditary transmission of the disease, not in the sense, however, of the inheritance of a particulate body, or virus, or germ, or of a blood disease, but of the inheritance of a peculiarity of the structure of the breast, especially of its epithelial elements, which predisposes it to the occurrence of cancer. Thin<sup>1</sup> believes that the vital qualities of the epithelium are feebly developed, through which it is rendered permanently weak and liable to take on the perverted action which gives rise to carcinoma more readily than in persons with normal epithelium. Be this as it may, and I regard the view as being most philosophical, it is certain that cancer is a disease of the obsolete or obsolescent breast. When the affection sets in before the climacteric, the breast is none the less beginning to be useless, in consequence of the changed proportions which exist between its component tissues, the connective tissue stroma predominating. It

<sup>1</sup> *British Medical Journal*, 1883, vol. i. p. 555

is this peculiarity of structure, along with the weakness of the secreting elements through original fault of development, that is inherited, and the wonder is that the histories of inheritance are not more frequent and more conclusive. That hereditary transmission will in the future be found to be the most powerful factor in perpetuating the disease admits, in my mind, of no question; but it will require many years of careful watching of the children of carcinomatous ancestors before this point can be determined. In conducting these investigations it must be remembered that a tumor of the breast of the descendant of a cancerous ancestor may be of an entirely different nature, since, for example, I find that in not less than 5 of 70 retention cysts there was an unmistakable history of carcinoma in the ancestors. For this reason the diagnosis should be based upon minute examination of the growths occurring in the children of cancerous parents.

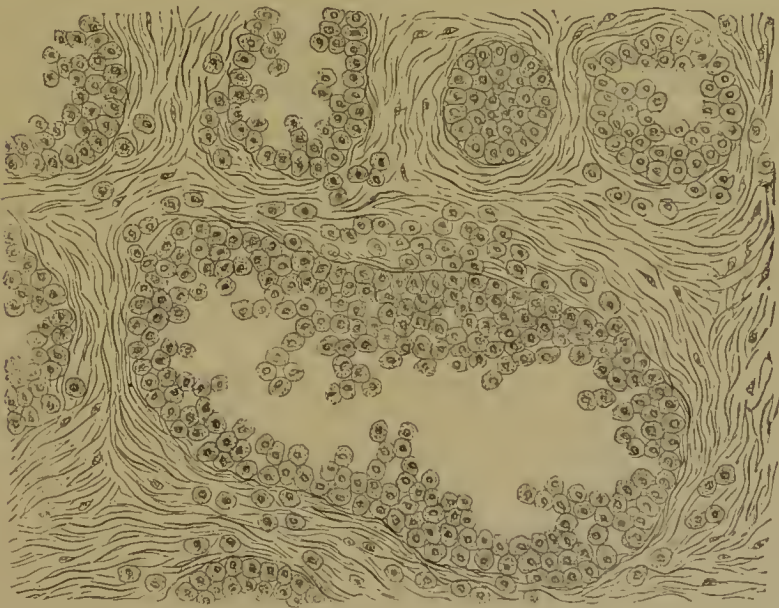
Of the causes which favor the occurrence of cancer, antecedent attacks of deep-seated or superficial inflammation of the breast are regarded as being of great importance, and this is especially true of puerperal mastitis and abscess. Of the 907 parous women, 189, or 20.08 per cent., had suffered from puerperal mastitis; but before accepting this bare statement as a proof of a direct connection between the two diseases, there are several points which demand a careful scrutiny. In the first place, the tumor did not always appear on the same side as the inflammation; secondly, the changes produced in the breast by the inflammation are comparatively rarely described; thirdly, the carcinoma has not always been shown to have developed in the portion of the gland that had been inflamed; and, finally, the interval between the inflammation and the appearance of the cancer has usually extended over many years. Of 120 cases of mastitis or abscess in which the histories are clear, the tumor arose in the same breast in 104 and in the opposite breast in 16; but in only 49 could it be demonstrated that it developed out of lumps or circumscribed indurations left by the inflammation. In only 7 cases was the mastitis recent; in the remainder from four to thirty years had elapsed between the inflammation and the appearance of the tumor, the average having been more than fourteen years. These data, in connection with the fact that unmarried and sterile females are free from this cause, render the connection between puerperal mastitis and carcinoma doubtful, although it cannot be denied that mastitis does result in chronic indurations which are made up of dense cicatricial fibrous tissue enclosing glandular elements, thereby giving rise to a structure similar to that of a normal breast during senile involution. Hence, it is not astonishing that, under the influence of the period of life at which carcinoma usually appears, the epithelial elements should not react physiologically, but now and then grow atypically and lay the foundation of cancer.



Nonpuerperal abscess of the breast preceded the development of carcinoma in 1 out of 44 cases from the practice of Rose, and in 5 out of my own 207 cases, in 4 of which the tumor appeared at the site of the abscess. It is also quite probable that deep lesions of the nipple, which continue to be irritated by the nursing child, may exert an influence, as they were present in 14 out of 373 cases in which this point is noted.

Of the remaining precursory conditions of carcinoma, the so-called eezema of the nipple and areola, to which attention was first directed by Sir James Paget, has attracted considerable attention during the past thirteen years. Thin,<sup>1</sup> however, has conclusively shown, and the same point is illustrated in Fig. 50, from De Schweinitz, that

FIG. 50.



Transverse Section of the Nipple, showing the dilated ducts occupied by proliferating epithelium, which at several points is invading the peritubular connective tissue.

the disease is a malignant papillary dermatitis, secondary to carcinomatous degeneration of the epithelium of the mouths of the lactiferous ducts, which leads to destructive changes in the papillary layer of the skin of the nipple and areola, and finally extends along the ducts into the substance of the mammary gland. Hence, the so-called eezema is not a precancerous inflammatory condition, but indicates in reality the early stage of cancer occurring in an unusual situation. Cancer being already present, the morbid condition of the skin is, therefore, an effect and not a cause.

That injuries, such as contusions and blows, are efficient causes of

<sup>1</sup> *Trans. Path. Soc., London*, vol. xxii. p. 218.



carcinoma, by inciting an atypical growth of epithelium in the involuting breast, cannot be doubted. Thus, the affection was ascribed to trauma in 202, or 13.36 per cent., out of 1511 cases; but it should be mentioned that in only 55 is the evidence conclusive that the tumor developed out of indurations or other conditions following the injury, and that in only 9 did the carcinoma immediately follow the cancer. Just how often the repeated irritation occasioned by badly constructed corsets may prove a factor it is impossible to determine.

In reviewing the predisposing and exciting causes of the disease it is evident that the age of the patient, which simply denotes atrophy or senility of the tissues of the breast, local irritation, and inheritance, which implies the transmission of peculiarity of structure, are the only factors of which we have any clear knowledge; so that, in the language of Jonathan Hutchinson,<sup>1</sup> it may be said that "senility gives proclivity, local irritation excites, and, subsequently, hereditary transmission may perpetuate," the affection. The social condition, as declared by Winekel,<sup>2</sup> cannot exert any influence upon the development of carcinoma, since the proportion of single women suffering from it, when compared with that of the married, is not much less than the general proportion of single women; while there cannot be any possible connection between childbearing and cancer, since, of women suffering from carcinoma, the proportion of sterile to parous women is about the same as in health.

Carcinoma usually commences as a small, circumscribed, densely hard, uneven, or nodulated solitary tuber or lump, which is movable under the skin, but fixed in or to the breast itself. In 3.06 per cent. of all cases two or more nodules<sup>3</sup> are met with, and in still more exceptional instances, the disease occurs as an infiltration of the entire gland, especially when it arises during pregnancy or lactation. In 1.31 per cent. of all instances it begins in the lactiferous ducts of the nipple, as Paget's disease or malignant papillary dermatitis.

Of 1664 cases in which the breast affected is noted, the growth occupied the right in 793, and the left in 869, and both breasts simultaneously in 2, so that it is more frequent, by 4.54 per cent., in the left. The seats of election are the upper and outer portions of the gland and the immediate vicinity of the nipple and areola. Thus, of 820 cases in which the locality is mentioned, the tumor occupied—

<sup>1</sup> *British Med. Journal*, vol. i. 1883, p. 553.

<sup>2</sup> *Lehrbuch der Frauenkrankheiten*, p. 765.

<sup>3</sup> It should be remembered that the presence of two or more nodules in the breast does not always indicate that the nodules are of the same nature. Thus, Kuester and Parker have recorded a fibroma and carcinoma, Richet and Paget two fibromata, I myself have met with three fibromata, and Waldeyer has seen eight fibromata coexisting with carcinoma.

The upper hemisphere in . . . . .	90	The upper and outer quadrant in . . .	206
The lower " . . . . .	51	The " inner " . . . . .	55
The outer " . . . . .	83	The lower and outer " . . . . .	32
The inner " . . . . .	32	The " inner " . . . . .	40
		Vicinity of the nipple and areola in . .	231

In not less than 379, or 46.22 per cent., was the tumor seated in the upper and outer portions of the gland, while it occupied the region immediately beneath and around the areola and nipple in 231, or 28.17 per cent. In exceptional instances it develops in an aberrant or outlying lobule just below the clavicle, near the sternum, or in the axilla, so that when met with in the last locality the tumor has been described as originating in an axillary lymphatic gland.

The increase of carcinoma, when compared with the other mammary neoplasms, is slow, so that it rarely attains any considerable bulk. In ordinary scirrhus and colloid cancer the tumor is usually smaller than the gland or portion of the gland that it has replaced; in that form of scirrhus in which the fibrous and epithelial constituents exist in about equal proportion, the volume of a small fist is not uncommon, and it may even measure five inches and a half in diameter, as happened in one of my cases which had lasted three years before it was extirpated; in withering scirrhus the tumor is rarely as large as a walnut, while in medullary carcinoma the size of a child's head is not uncommon. Hence, the volume depends upon the relative proportion of the component constituents, being large when the cells predominate, and small when the fibrous stroma is in excess.

The rate of growth is not, contrary to the generally received opinion, influenced by the early age of the patient, since I have failed to discover that the increase is more rapid before the age of forty than when the tumor develops later in life. When, however, carcinoma appears during pregnancy or during lactation, its growth is wonderfully rapid, and its course is excessively malignant, of which facts several striking instances are recorded by Klotz,<sup>1</sup> Paget,<sup>2</sup> and Henry.<sup>3</sup> In the case of a lady under my own care a tumor of the volume of a small walnut was accidentally detected in the sternal portion of the left breast in the sixth month of her first pregnancy. In two weeks the entire breast was involved, and when I saw her, twelve weeks after the first observation of the disease, the breast was firmly fixed to the chest, the skin was adherent, thick, brawny, and pervaded by stuffed lymphatics, and the axillary, as well as the supraclavicular, glands were extensively invaded. In a remarkable instance reported by Billroth<sup>4</sup> the disease

<sup>1</sup> "Ueber Mastitis Carcinomatosa Gravidarum et Lactantium," *Inaug. Diss.*, Halle, 1869.

<sup>2</sup> *Op. cit.*, p. 639.

<sup>3</sup> *Op. cit.*, p. 80.

<sup>4</sup> *Chir. Klinik.*, Wien, 1871-76, p. 258.

developed in both breasts five weeks before the woman's eighth confinement; and on death, seven days after an easy and natural delivery, or six weeks after the first observation of the disease, the mammae were larger than a child's head, and secondary deposits were found in the thyroid gland, pericardium, liver, omentum, and kidneys.

During its further increase—and it grows by progressively invading or infiltrating the tissues at its periphery—or when it has attained only a moderate volume, carcinoma evinces signs which are of great diagnostic value even before the contiguous structures are visibly contaminated, and which are referable to its tendency to contract or draw the component tissues of the breast itself and the adjacent structures into its midst—a tendency due to cicatricial or atrophic changes going on in its older or more central portions.

Among the earliest of these phenomena, particularly when the tumor is superficial, is a dimpling or pitting of the skin. This pitting is entirely independent of carcinomatous adhesion between the skin and the growth, and arises from shortening of the fibrous bands or processes of the superficial mammary fascia which pass from the posterior surface of the skin into the interior of the breast, and which Sir Astley Cooper called the suspensory ligaments. This sign, along with the age of the patient and the consistence of the growth, has enabled me, in several instances, to diagnose the true nature of a tumor not larger than a small filbert.

In 5.22 per cent. of the noncarcinomatous neoplasms of the breast the nipple is buried, displaced, or sunken, simply for the reason that the tumor grows beyond its level, so that by pushing back the former the nipple, as a rule, again partly protrudes. In carcinoma, on the other hand, the mamilla is permanently retracted and fixed, as is

FIG. 51.



Scirrhus, showing retraction of the nipple.

shown in Fig. 51, because the contracting growth draws it toward itself by shortening the milk ducts which terminate at its extremity; and this process is the more apparent when the neoplasm develops in the immediate vicinity of the lacteal sinuses, or when the nipple itself is infiltrated and becomes the seat of cicatricial contraction. In my own 207 cases—and writers, strange to say, rarely refer to this point—a retracted nipple was observed in not less than 108, or 52.17 per cent., the large proportion being due to the fact that in 75 the carcinoma was seated in the immediate vicinity of the mamilla and areola. As the nipple is sunken in only 5.22 per cent. of the noncarcinomatous neoplasms, I regard it as a sign the value of which cannot be overesti-

plasmus, I regard it as a sign the value of which cannot be overesti-

mated. In one of my patients it was the first feature, along with a straw-colored discharge, that directed attention to the disease.

In 15 of my 207 cases there was a spontaneous discharge from the nipple, the fluid being, as a rule, either watery or bloody or thick and lactescent, while in two additional cases a thick, milky fluid, the so-called cancer-juice, could be expressed. In one-third of the cases the discharge preceded the detection of the tumor.

To the same cause, or intraction of, combined with pressure upon, the nervous filaments which supply the breast, may be ascribed the pain of which patients so commonly and so early complain. Usually of an intermittent, darting, pricking, or neuralgic character at the outset, the suffering becomes more constant and aggravated with the progress of the disease, and particularly when the skin is extensively invaded and ulcerated, the lymphatic glands infiltrated, and the arm swollen, until finally it is frequently atrocious, extending in various directions, as, for example, to the shoulder, neck, back, and arm, interfering with sleep and nutrition, and hastening the fatal issue. In 4 per cent. of all cases there is absolutely no suffering whatever; in 8 per cent. there is merely a sensation of discomfort or weight; while in 88 per cent. there is real pain, which varies, however, greatly in intensity and character.

With the further advance of the disease, but not, on an average, before the expiration of fifteen months after its first observation, marked changes ensue. These indicate, first, local infection, or regional dissemination, through the extension or growth of young epithelial cells, along the course of the lymphatics and perivascular lymph sheaths, into the adjacent tissues; and, secondly, the transfer of the cells by the lymphatic vessels to the associated lymphatic glands. These changes, when regarded in their chronological order, are invasion of the skin, the glands, the muscles of the chest, the ribs, the pleura, the anterior mediastinum, and the opposite breast.

Infection of the contiguous tissues shows itself either in the form of adhesion or fixation of the tumor to the skin and walls of the chest, or as distinct nodules or tubers which are visible to the naked eye when superficial or are detected during operative procedures.

Of the 1414 cases in which this point is noted, invasion of the skin, as evinced by its adhesion or discoloration, was met with in 599, or 42.36 per cent.; by the formation of tubers in 152, or 10.44 per cent.; and by ulceration in 338, or 23.90 per cent.; so that, omitting the cases in which two or more of these features are present, it is involved in 62.26 per cent. of all instances. In the majority of cases the skin is adherent, thinned, and of a purplish, bluish-red, or dusky-red tint, with enlargement of its small vessels, and the seat possibly of superficial and limited desquamation, conditions which precede ulceration.



In some examples it is thick, rigid, and brawny, like the skin of a lemon or the rind of bacon, and now and then œdematous, and pervaded by varicose lymphatics, which may be plugged with epithelial cells or merely obstructed by lymph cells, or it may be drawn in so as to resemble a cicatrix. When nodules form, they may present the appearance of flat, irregular plates; but they are usually shot-like or pea-like or biconvex, and frequently attain the size of a hazelnut or a small hickory-nut, and are covered by discolored skin. Occasionally, and particularly when the subcutaneous connective tis-

FIG. 52.

Local Dissemination of Scirrhus.<sup>1</sup>

sue is simultaneously involved, they form large masses, as in Fig. 52, from one of my cases, which extend beyond the middle line

<sup>1</sup> Eliza C—, aged fifty-five years, the mother of two children, ceased to menstruate fourteen years ago, and was not aware of a family history of cancer. About two years ago, while washing the right breast, she accidentally noticed a firmly fixed, painless growth, as large as an English walnut, two inches above and to the right of the nipple. She remained in this condition for twelve months, when the skin around the base of the mamilla became ulcerated, and discharged a thin and fetid fluid. Excessive pain of a darting and cutting nature manifested itself at the same time, and had con-

of the chest, involve the opposite breast, ulcerate, produce great suffering, and finally convert the front and sides of the thorax into a mass of offensive disease. Under these circumstances the tubers need only undergo atrophic changes to constitute the affection known as cancer en cuirasse, which is met with once in every twenty-two cases. When withering does not ensue, the affection is termed lenticular cancer by Schuh, and pustular or disseminated scirrhus by Velpeau, and the disease may extend to the neck, shoulder, arm, abdomen, and back. In other cases, by the union of the nodules with the main tumor, and by their progressive growth, the breast is converted into a large bossed mass.

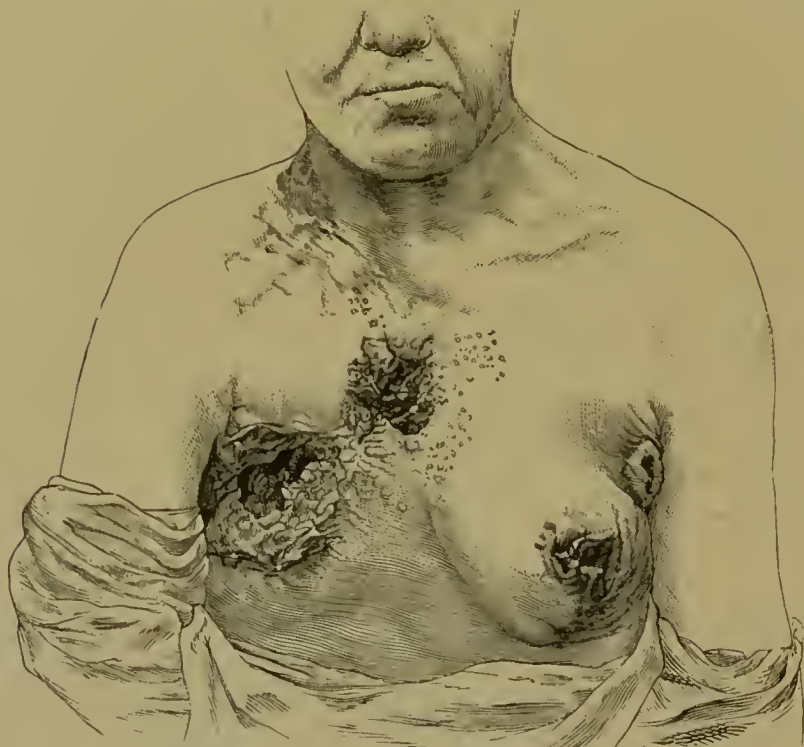
Invasion of the skin is the earliest perceptible sign of local malignity, but it may be delayed for seven or eight years. I have met with it as early as two weeks; but the average date of its appearance is 15.8 months, which is the mean of 13.9, 14.4, 15.8, 13.6, 25.1, and 12 months, recorded, respectively, by Winiwarter, Oldekop, Sprengel, Hildebrand, Heineke, and myself. According to the observations of Heineke, Sprengel, and myself, the skin becomes adherent 1.5 months before the formation of nodules or tubers.

Although I have included ulceration among the phenomena of infection of the integument, many ulcers result from fatty and disintegrating changes which take place in the substance of the tumor itself. Hence the process may be superficially or deeply seated. In the former event the thinned and discolored skin is at first cracked, fissured, excoriated, or eroded, and covered by thin crusts. Ere long a sore forms which has a pale granulating base and discharges a thin, offensive fluid. Now and then it heals over, the cicatrix being thin, tense, red, and

continued ever since, with remissions in severity. She stated that the original tumor gradually disappeared, and that small lumps, "like peas," made their appearance in the skin to the inner side of the affected breast, and extended to the left breast nine months ago. The entire anterior surface of the thorax looked as if it had been converted into an irregular fungous mass, covered here and there with drops of blood and yellowish pus. On closer inspection, however, the red and prominent nodules and bosses were seen to be free from the ordinary appearances of fungus, their surface being, for the most part, merely excoriated or fissured, while some were covered by crusts. To the touch they were firm, and somewhat elastic and tender. Varying in size from a small shot to an orange, they were multiform, convex on both surfaces, and inseparably connected with the chest. The discharge was profuse, and had a sickening odor. Some of the nodules showed distinct evidence of cicatrization of the superficial ulcers in the form of a thin epithelial covering, while one was sloughing off. The original breast and tumor were converted into a large, red, thin, adherent cicatrix. Of the left breast nothing remained except its lower half with the deformed nipple. Three small nodules of carcinoma were seated in the skin over the summit of the left shoulder, and were quite independent of the main mass. The supraclavicular glands of the right side were contaminated, and a cluster of hard glands, as large as an egg, occupied each axilla. The woman's general condition was excellent. Death ensued eight months subsequently, or thirty-two months from the date of the detection of the disease.

traversed by small vessels, or healing occurs in the first breach of continuity, while the ulceration continues to spread. In the second form

Fig. 53.

Local Dissemination and Ulceration of Scirrhus Carcinoma.<sup>1</sup>

of sore, or that which ensues from the breaking down of the tumor, there is, as delineated in Fig. 53, from a clinical case, a deep, exca-

<sup>1</sup> From a married and prolific female fifty-two years of age. The disease was of two years' duration, was traceable to heredity and trauma, and was first noticed two years after the menopause as a small tumor beneath the retracted nipple of the right breast. In four months there was a thin and bloody discharge from the mammilla. The glands of the corresponding axilla were enlarged in ten months, and in twelve months along the posterior border of the sternomastoid muscle and in the supra-clavicular fossa. At the same time a nodule appeared in the skin of the upper sternal region. In fifteen months the disease had disseminated itself in the form of small nodules in the skin over the greater part of the right chest, a tuber appeared in the left mamma, and the left axillary glands enlarged. In seventeen months the sternal, left mammary, and left axillary tumors ulcerated spontaneously. Her health had failed during the last six months. She was frequently nauseated, and vomited after meals; the appetite was poor; and she suffered great pain in both breasts, the neck, and the right arm.

As a result of caustic applications the right mamma and a portion of the axilla were replaced by a huge, irregular, deep, funnel-like ulcer, with everted, indurated edges, showing here and there evidences of cicatrization and a granulating surface, which bled readily on changing the dressings. The mass over the sternum consisted of two large, hard, and red tubers above, and of a superficial ulcer below as large as a silver dollar. The outer half of the left breast was converted into a densely hard tumor, which was ulcerated around and at the outside of the nipple, the latter of



vated, or crater-like cavity, with irregular, discolored, full, indurated, and everted edges, and a base which is usually formed of hard granulations and which discharges a puriform, bloody, foul, or ichorous fluid.

The ulcer of carcinoma differs from that of the other mammary neoplasms. In myxoma and sarcoma especially the sore may be deep and excavated and its walls composed of disintegrating tumor tissue; but the ulcer of the simple growths is essentially a fungating one—that is to say, it is attended with the protrusion of pedunculated masses, which are not attached to the sides of the ulcer. The edges of the ulcer are, moreover, smooth, even, and free from discoloration and infiltration. Although carcinoma is said to throw out fungous masses, I fancy that the statement is mainly traditional.

I have witnessed ulceration as early as 2 months, but it usually declares itself, on an average, in 19.9 months. Winiwarter fixes the mean date of its appearance at 17.7 months, Oldekop at 26.4 months, Sprengel at 20.3 months, Heineke at 19.3 months, while my cases averaged 15.8 months.

Of the signs of local infection, the next in order of frequency is invasion of the deep tissues, as indicated by infiltration of the pectoral fascia or the formation of distinct nodules in the pectoral and intercostal muscles and ribs, which corresponds to the fixation or adhesion of the tumor to those structures. Of 1020 cases in which this point is noted, the mamma was mobile in 860, and more or less closely adherent in 160, or 15.69 per cent. In the latter class of cases distinct tubers were also found, on operation, in 1 case out of every 9.3 in the pectoral muscles, in 1 out of every 73.6 in the intercostal muscles, and in 1 out of every 37 in the ribs. In 1 case out of every 12.3, nodules were present in the paramammary fat.

Immobility of the tumor on the subjacent tissues is witnessed, on an average, in 21.9 months, which is the mean of 22.7, 23.4, 24.8, and 16.9 months, recorded, respectively, by Winiwarter, Oldekop, Heineke, and myself. Hence, it will be observed that fixation of the growth ensues 6.1 months after adhesion to the skin and 2 months after ulceration. I have myself met with it as early as the second and as late as the twenty-seventh month. It, moreover, usually coexists with infection of the lymphatic glands, the presence of which may be suspected, if they cannot be felt, whenever fixation of the tumor declares itself.

which was partially destroyed. The skin was infiltrated, below and at the outer side, by flattened plates of carcinomatous material. The glands of the left axilla formed a dense, round tumor, as large as a small apple, and the skin was superficially ulcerated, the edges of the sore being excessively hard and livid. The integument of the sternal border of the left mamma, around the sternal growth, and over and below the right clavicle, was occupied by numerous shot-like and lenticular deposits, a few of which were as large as a filbert. The supraclavicular glands and the glands beneath and over the right sternomastoid muscle were converted into secondary tumors.



Among the more uncommon evidences of local dissemination is the invasion of the opposite breast, which is noted in 48, or 2.85 per cent., of 1681 cases. Although I have included this as one of the symptoms of local extension of the disease, it is highly probable that, in the majority of the cases, the disease was independent of the tumor of the first breast affected. Be this as it may, implication of the other breast is a late sign, appearing, on an average, at 29.8 months, although it is witnessed as early as four months, and as late as six years. Of 28 cases of which I have the full particulars, in 24 it was preceded by enlargement of the glands; and in 13 of these there were also nodules in the skin, and ulceration was present in the original tumor in 7. In 2 cases there was no glandular involvement, but in both the disease was preceded by cutaneous tubers and by ulceration of the primary growth. In 2 there were no complications.

From the preceding facts we learn that carcinoma evinces a remarkable disposition to infect the adjacent tissues, and that it progresses at first toward the surface. The skin is invaded in 66.26 per cent., deep attachments ensue in 15.69 per cent., and the opposite breast suffers in 2.85 per cent. of all instances. The occurrence of local dissemination is, moreover, indicated by the formation of circumscribed nodules in the skin in 10.44 per cent.; in the paramammary connective tissue in 8.13 per cent.; in both of these situations, as in the cuirass form of cancer, in 4.57 per cent.; in the pectoral muscles in 10.77 per cent.; in the intercostal muscles in 1.35 per cent.; and, finally, in the ribs in 2.7 per cent.<sup>1</sup> In the order of the date of their appearance we may look for extension to the superficial fascia and skin in 15.8 months, for ulceration in 19.9 months, for fixation to the chest in 21.9 months, and for invasion of the second breast in 29.8 months. These facts, elicited by clinical and post-mortem evidence, have an important bearing upon the question of glandular infection and the formation of secondary growths in the internal organs. Thus, of the 192 cases of local dissemination, recorded by v. Török and Wittelshöfer, invasion of the glands was met with in 52.6 per cent., and metastases were discovered in 72.9

<sup>1</sup> These points are still further illustrated by v. Török and Wittelshöfer from the records of 366 post-mortem examinations of women dead of carcinoma of the breast, an account of which may be found in *Langenbeck's Archiv*, Bd. xxv. p. 873. In 184 an operation had been performed, while 182 ran a natural course. Of the entire number, 192 were marked by local dissemination or regional infection. The skin was invaded in 148, or 40.43 per cent., in 38, or 10.38 per cent., of which nodules were present, and in 110, or 74.32 per cent., of which ulceration had taken place. The chest muscles were infected in 80, or 21.86 per cent; tubers were found in the pectoral in 58, or 15.84 per cent., and in the intercostals in 22, or 6.01 per cent. The bony walls of the chest were affected in 52, or 14.20 per cent., the ribs being involved in 29, or 7.92 per cent., the sternum in 20, or 5.46 per cent., and the clavicle in 3, or 0.82 per cent. The pleura was involved in 25, or 6.08 per cent., the pericardium in 2, or 0.54 per cent., the mediastinal glands in 24, or 6.55 per cent., and the opposite breast in 33, or 9 per cent.

per cent. Of the 174 cases, on the other hand, which were free from local infection, the glands were affected in 42.5 per cent., and metastases had occurred in 45.4 per cent. Hence, it appears that the occurrence of glandular and systemic infection is greatly favored by local dissemination. All of these data must be considered in deciding the question of operation, to which reference will again be made under the head of Treatment.

*Invasion of the Neighboring Lymphatic Glands.*—The reproduction of carcinoma in the associated lymphatic glands is one of the most practically interesting of its malignant features, and exerts a decided influence upon the course of the disease, upon the formation of metastatic deposits, and upon the final issue after operative procedures. As the loose collections of cells are contained in the lymph spaces of the mammary gland, which are the radicles of the lymphatic vessels, one can readily conceive how easily, and, indeed, how inevitably, as is so well illustrated in Fig. 54, from Cornil and Ran-

FIG. 54.



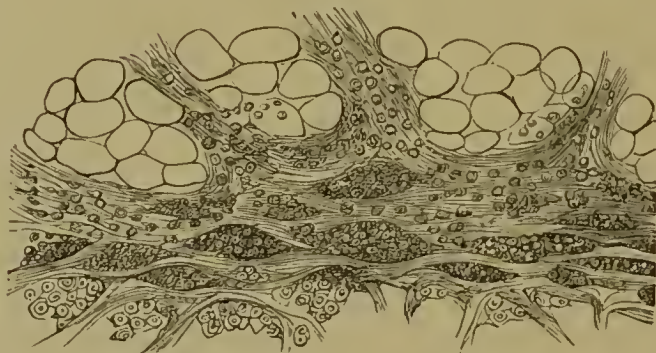
Carcinoma of the Mammary Gland, the Ground Substance of which is stained with Nitrate of Silver: *a, a*, alveoli of the carcinoma filled with cells; *b, b*, lymph spaces; *c*, lymphatics, showing silver staining of the endothelium.  $\times 150$ .

vier, the young epithelial elements are transported to the lymphatic glands in the axilla and above and below the clavicle, where they implant themselves, proliferate, and reproduce the likeness of the parent growth. When the glands are affected, they delay<sup>1</sup> for a certain period, on the one hand, metastatic deposits, and, on the other hand, constitute new foci of local and general infection. Hence the

<sup>1</sup> Von Török and Wittelschöfer, *op. cit.*, p. 880, show that in 20 per cent. of all examples of invasion of the glands metastatic tumors are absent.

cells of a packet of indurated and enlarged glands behave precisely like the primary tumor; that is to say, they invade the surrounding tissues, as shown in Fig. 55, from Billroth, and infect the adjoining

FIG. 55.



Cellular Invasion of the Tissues around a Carcinomatous Lymphatic Gland.  $\times 350$ .

glands and the viscera. Just how often the glands enlarge as a result of inflammatory or irritative hyperplasia, as is witnessed in other mammary neoplasms, I am unable to say; but it is very certain that they are not always carcinomatous, since, as I shall show hereafter, several cases are on record in which, having been left behind during operations, they have subsided, and the patients were living several years—in one case, indeed, ten years afterward—free from disease.

Out of 1638 cases in which it is mentioned, glandular infection was witnessed in 1115, or 68.07 per cent., when the patient first came under observation. In all of these cases the axillary glands were affected, and along with these the supraclavicular glands were involved in 5.44 per cent., the subclavicular in 1.34 per cent., and the cervical in  $\frac{6}{10}$  of 1 per cent.

Of the 366 post-mortem examinations recorded by von Török and Wittelshöfer,<sup>1</sup> the axillary glands were infected in 175, or 48.08 per cent., the supraclavicular in 4.1 per cent., and the cervical in 4.1 per cent. The smaller proportion is, doubtless, due to the fact that one-half of the cases had been subjected to operation.

Carcinomatous degeneration may occur in a few weeks or may be delayed for seven years. In 136 examples I myself have witnessed it as early as two weeks and as late as five years, the latter being an instance of atrophying scirrhus. About 1 case in every  $4\frac{1}{3}$  is met with in the first six months; but the average date of its appearance is 14.7 months, which is the mean of 14.7, 16.5, 9.7, 14.3, 20.6, and 12.8 recorded, respectively by Winiwarter, Oldekop, Heineke, Sprengel, Fischer, and myself. Hence, it antedates invasion of the skin by one month, ulceration

<sup>1</sup> See note on preceding page.



tion by five months, deep adhesions by seven months, and extension to the opposite breast by fifteen months. In exceptional instances it is even observed before the primary tumor is noticed.

A point of interest, and it is one which must have attracted the attention of every surgeon, is, that the seat of the carcinoma exerts no influence upon the frequency or the date of the appearance of the lymphatic tumor. In other words, the glands are not involved earlier or oftener when the original growth is near the axilla than when it occupies the inner periphery of the mamma.

While it is an established fact that the cases uninfluenced by operation, in which the gland contamination does not evince itself until late, pursue a more chronic course, and do not perish nearly so quickly as those in which the glands are infiltrated early in the affection, statistics show conclusively not only that the chances of removing the entire disease are greatly lessened when the glands are enlarged, but that, as in the former instance, the patients succumb much sooner, and that recurrence is far more rapid. Thus, of 136 subjected to operation, 43 were free from glandular tumors, and their average life from the first observation of the disease to the fatal issue was 52.7 months. Among these patients local reproduction ensued, on an average, in 8 months. Of 93 in whom both the breast and the glands were removed, the mean life was 39.3 months and the average time of recurrence was 1.9 months. Hence, the former lived 13.4 months longer than the latter, and when there was recurrence it appeared 6.1 months later.

The number of glands involved is sometimes enormous, being greater even than the study of normal anatomy leads one to conceive. Thus, from a woman forty-eight years of age, in whom the disease had existed eighteen months, fifty glands, which varied in size from a small shot to a hazelnut, were removed. On her return to the clinic, ten weeks subsequently, the disease was found to have recurred at the edge of the pectoral muscle, in the axilla, and in the supraclavicular glands.

In the majority of instances the glands are separate and distinct. In others they constitute a densely hard, conglomerate, knobby mass; while now and then the disease is confined to a single gland, which may, as in a case of my own, measure three inches and a quarter by one inch and three-quarters in its long and short diameters.

*Metastatic Deposits.*—After invasion of the lymphatic glands the cells pass into the circulatory system, are transported to the viscera, the bones, and other tissues, in which they proliferate, reproduce the likeness of the primary growth, and in this way develop metastatic deposits or growths. General dissemination may, however, manifest itself without antecedent glandular infection, but such a course is exceptional. Thus, of 61 post-mortem inspections in which systemic secondary tumors were discovered, the intervening glands were involved in 52, or 85.24 per cent.; in 2, or



3.27 per cent., there were merely tubers in the skin and pectoral muscle; while in 7, or 11.47 per cent., there were no primary complications whatever. Hence, in about 1 case in every 7 metastasis occurs without implication of the glands; from which it appears that infection may take place through the bloodvessels, and that the absence of enlarged glands affords no absolute guarantee that the viscera are not already invaded. The presence of metastatic tumors without antecedent glandular infection is also demonstrated by the investigations of von Török and Wittelshöfer. Thus, of 175 cases complicated by infected axillary glands, secondary growths were found in 57.7 per cent., while of 191 cases without glandular involvement, metastases had occurred in 62.3 per cent.

Of the frequency of metastatic deposits our knowledge is not satisfactory, for the reason that it is by no means easy to follow our cases or to obtain post-mortem examinations. My own observations in this respect are worthless, as I was enabled to make a section in only one case, it being one of atrophying scirrhus which had lasted for upward of seventeen years, and in which I detected tumors in the lungs, the pleura, the bronchial and mediastinal glands, and the right kidney. The tables of Winiwarter, Oldekop, Henry, Kaeser, Kuester, Sprengel, Riedel, Estlander, Fischer, and Hildebrand, however, contain 134 cases of general dissemination confirmed by section after death, and 70 cases in which that condition was determined by well-marked symptoms during life. They were distributed as follows:

Died without operation . . . . .	74	Metastases in 11	Presumed metastases in 6
Died from the effects of operation . . . . .	168	" 15	" " 0
Died with recurrence after operation . . . . .	435	" 72	" " 49
Died with metastases, but without recurrence after operation . . . . .	36	" 36	
Died with presumed metastases, but no recurrence after operation . . . . .	15	...	15
	728	134	70

Hence, of 728 patients, metastatic deposits had formed, or were presumed to have formed, in 204, or 28.02 per cent. As indicated by section, they were present in 51 per cent. This latter point is interesting, as it denotes that death ensues in one-half of all cases merely from the baneful effects exerted upon the nutrition of the patient without cancerous degeneration of the viscera, or from intercurrent diseases, of which the most common are pleuritis, tubercle, and pneumonia.

The date at which metastases form varies from five months to eight years. Out of every 100 cases 24 will be found within a year; 3 in

from thirteen to eighteen months; 18 in from nineteen to twenty-four months; 27 in from twenty-five to thirty-six months; and 28 after three years. Winiwarter, Henry, Oldekop, and Sprengel compute the average date of death from metastases from the first appearance of the disease, respectively, at 23.7, 31.7, 38.2, and 24 months, so that the general mean is 29.4 months, or 14.7 months after glandular infection.

In the 114 cases in which sections were made after death the relative frequency of the seats of the secondary deposits is shown by the following statement:

Dura mater . . . . .	in 3 cases.	Ovary . . . . .	in 3 cases.
Pleura . . . . .	" 17 "	Uterus . . . . .	" 1 case.
Pericardium . . . . .	" 2 "	Bladder . . . . .	" 1 "
Brain . . . . .	" 3 "	Peritoneum . . . . .	" 1 "
Lung . . . . .	" 41 "	Omentum . . . . .	" 1 "
Esophagus . . . . .	" 1 case.	Bones . . . . .	" 18 cases.
Stomach . . . . .	" 11 cases.	Muscles . . . . .	" 2 "
Intestines . . . . .	" 2 "	Bronchial glands . . . . .	" 3 "
Liver . . . . .	" 42 "	Mediastinal glands . . . . .	" 4 "
Spleen . . . . .	" 5 "	Retroperitoneal glands . . . . .	" 5 "
Kidney . . . . .	" 5 "	Mesenteric glands . . . . .	" 2 "
Adrenal . . . . .	" 1 case.		

With a view to determine the relative frequency of the locality of the metastatic growths from a larger number of cases, I have obtained the following results by adding to the 114 cases 89 compiled by Arnold, Morris, and Clark from the registers of the Middlesex Hospital and 220 recorded by v. Török and Wittelshöfer. Thus, of 423 post-mortem inspections, secondary tumors were discovered in the—

	Per cent.		Per cent.
Dura mater . . . . .	in 25, or 5.9	Stomach . . . . .	in 20, or 4.7
Brain . . . . .	" 40, " 9.4	Intestines . . . . .	" 8, " 1.8
Spinal cord . . . . .	" 1, " 0.2	Pancreas . . . . .	" 7, " 1.6
Pericardium . . . . .	" 19, " 4.4	Omentum . . . . .	" 6, " 1.2
Heart . . . . .	" 4, " 0.9	Esophagus . . . . .	" 1, " 0.2
Venous system . . . . .	" 4, " 0.9	Kidney . . . . .	" 24, " 5.7
Bronchial glands . . . . .	" 15, " 3.5	Adrenal . . . . .	" 8, " 1.8
Mediastinal glands . . . . .	" 4, " 0.9	Bladder . . . . .	" 3, " 0.7
Retroperitoneal glands . . . . .	" 23, " 5.4	Ureter . . . . .	" 1, " 0.2
Mesenteric glands . . . . .	" 14, " 3.3	Manima . . . . .	" 33, " 7.8
Lung and pleura . . . . .	" 38, " 8.9	Uterus . . . . .	" 22, " 5.2
Pleura . . . . .	" 178, " 42.0	Ovary . . . . .	" 34, " 8.0
Lung . . . . .	" 475, " 41.0	Tubes . . . . .	" 4, " 0.9
Thyroid gland . . . . .	" 8, " 1.8	Vagina . . . . .	" 2, " 0.4
Liver . . . . .	" 206, " 48.6	Bones . . . . .	" 87, " 20.5
Peritoneum . . . . .	" 20, " 4.7	Muscles . . . . .	" 3, " 0.7
Spleen . . . . .	" 20, " 4.7		

It will thus be seen that the digestive, respiratory, osseous, and nervous systems are the seats of predilection, and that the lungs suffer rather more frequently than the liver.

In connection with the occurrence of secondary deposits attention may be called to what Herbert Snow<sup>1</sup> calls "a neglected symptom in breast cancer;" that is to say, a thickening of the upper end of the humerus, with tenderness on pressure, which he declares sets in, in the majority of cases, simultaneously with enlargement of the axillary glands, and which he ascribes to carcinomatous invasion of the medulla. I have faithfully tested this symptom, and met with it only once in 107 cases. V. Török and Wittelshöfer<sup>2</sup> show that of 336 post-mortem examinations of women dead of mammary carcinoma, secondary deposits were found in 220, and of these the humerus was implicated in only 5, in 2 of which it had undergone fracture. Hence, neither clinical nor post-mortem evidence indicates that the observations of Snow are correct.

*Cachexia.*—With the progress of the local and general disease the so-called "cancerous cachexia" is established. This is nothing more than the general failing of the powers, such as is witnessed in many other maladies, attended with loss of blood, offensive and exhausting discharge, and suffering, and is due to the improper performance of the functions of the viscera, and the consequent ill effects produced upon the general nutrition, as indicated by wasting, loss of appetite and strength, nausea, sallowness, and a quick and feeble pulse. As we have just seen, death occurs, as demonstrated by post-mortem inspection, in an equal number of cases whether there be visceral deposits or not. The latter succumb from the intensity of the local disease and its effects; the former from the effects of metastases, as indicated by symptoms which denote implication principally of the lungs, pleura, liver, digestive organs, and nervous system.

*Prognosis.*—The foregoing facts, deduced from the morbid changes which ensue in carcinoma, clearly demonstrate that the prognosis of the affection is eminently unfavorable. This statement becomes the more apparent from the study of the cases which pursue a natural course and of those subjected to the knife. In this study are included the duration of life in each class and the influence of the operation on the progress of the disease.

Of 1527 cases, 137 ran a natural course, and 1390 underwent operation. Of the 137, 117 were dead, and of those in which the date was noted—

26.50	per cent.	died in between	5 and 12 months.
32.47	"	"	" 12 " 24 "
12.82	"	"	" 24 " 36 "
11.11	"	"	" 36 " 48 "
6.83	"	"	" 48 " 60 "
3.41	"	"	" 60 " 72 "
6.83	"	died after six years.	

The average duration of life was 28.6 months.

<sup>1</sup> *Lancet*, vol. i. 1880, p. 912.

<sup>2</sup> *Loc. cit.*, p. 883.

Of the 536 cases which perished after operation, with recurrence of the disease, and in 73 of which metastases were discovered, and were suspected in 56—

10.50	per cent.	died in between	6 and 12 months.
33.00	"	"	" 12 " 24 "
24.03	"	"	" 24 " 36 "
9.95	"	"	" 36 " 48 "
7.91	"	"	" 48 " 60 "
5.04	"	"	" 60 " 72 "
9.51	"	died after six years.	

The average duration of life in these 536 patients was 38.5 months; so that a comparison of the two tables shows that the course of the disease is retarded by the removal of the growth, and a comparison of the two averages indicates that operation adds ten months to the life of the patient.

Not only is life prolonged by operation, but the removal of the disease results in permanent recovery in 11.83 per cent. of all cases. As we have already seen, death from metastases occurs at 29.4 months, and the average date of death of those who succumb without or with operation is 33.5 months. We shall, moreover, see presently that local recurrence of the disease after three years is met with in only 2.30 per cent. of all cases. Hence, a radical cure may be assumed if the patient has survived the disease over three years without local or general recurrence after the last operation, or if she has died of some intercurrent malady under the same conditions.

Of 1234 cases submitted to the knife in which the histories could be followed, 134 were still living and 12 had died. Of these 146, recurrent growths were removed in 16, and there was freedom from disease after the last operation in—

45	for between	3 years and 1 month and	3 years and 11 months.
25	"	4 "	" 4 " 11 "
22	"	5 "	" 5 " 11 "
18	"	6 "	" 6 " 11 "
9	"	7 "	" 7 " 10 "
7	"	8 "	" 8 " 9 "
4	"	9 "	" 9 " 10 "
4	"	10 " and 1 month	" 10 " 10 "
3	"	11 "	" 11 " 9 "
4	"	12 "	" 12 " 3 "
3	"	13 "	" 13 " 8 "
1	for	14 " and 7 months.	
1	"	15 " " 7 "	

The average time of cure was five years and nine months, and the disease had existed before operation, on an average, for 13.3 months. The cases were not selected in order that the best possible results might be obtained, since I find that of 134 in which the nature of the opera-



tion is noted, the mamma was removed and the axilla was cleared out in 83, and the breast alone was amputated in 51, although in 3 of these enlarged glands were left intact in the axilla, and yet the cure was assured at the end, respectively, of five years and nine months, six years and one month, and ten years and ten months. It, however, appears that the percentage of cures is greater by 5.10 when the axilla is free than when the glands are infected, and that local reproduction does not militate against a final cure if the tumors be freely extirpated as soon as they appear. Of the 16 examples of repullulation, there was one recurrence in 12, two recurrences in 3, and three recurrences in 1. In these four cases the subjects were free from disease for three years and six months, three years and seven months, five years, and twelve years after the last operation. The practical deductions which can be gathered from such data are so clear that they do not require comment.

As a further proof of the influence exerted upon the duration of life by radical operations, attention may be called to the fact that nearly 30 per cent. were free from the disease after a lapse of six years; while of the 117 patients in whom no operation was practised, only 6.83 per cent. survived after that period.

Sir James Paget,<sup>1</sup> in speaking of the duration of life after operation, says: "I am not aware of a single clear instance of recovery—of such recovery, that is, as that the patient should live for more than ten years free from the disease." Applying this severe test, an examination of the table will show that 1 in  $9\frac{1}{2}$  fulfils this condition.

In addition to the 146 permanent cures after operation, 134 cases were alive without recurrence from the last operation for a period which varied from three weeks to three years, or 18.5 months on an average, and 49 were dead without local reproduction, their mean life having been twenty months. Of these 183, 6 remained well for three years, so that they should really be regarded as cures.

If the patient survives an operation, local recurrence of the disease may be looked for. Of 1390 operations, 198 died from its immediate effects, thereby leaving 1192 cases for the consideration of the question of local reproduction. Of these cases, 156 are devoid of further history, having been lost sight of immediately after recovery; so that of 1036 patients—

329 were well, but 35 had had recurrences.

121 were alive with recurrence.

407 died with recurrence, but with no evidence of metastases.

56 " " " and with presumed metastases.

73 " " " " " actual metastases.

35 " " metastases, but without recurrence.

15 " " presumed metastases, but without recurrence.

<sup>1</sup> *Op. cit.*, p. 649.

It will thus be perceived that the tumor reproduced itself locally in 692, or 66.80 per cent., after 1036 operations—a fact which accords with the infiltrating nature of the disease as demonstrated by observations during life and during operative proceedings.

In 478 cases in which the date was noted, the periods of recurrence were as follows :

						Within 15	days in	43 cases.
						" 1	month	" 63 "
From the	end	of the	1st	to the	end of the	3d	"	" 105 "
"	beginning	"	4th	"	"	6th	"	" 87 "
"	"	"	7th	"	"	9th	"	" 45 "
"	"	"	10th	"	"	12th	"	" 61 "
"	"	"	13th	"	"	18th	"	" 30 "
"	"	"	19th	"	"	24th	"	" 17 "
"	"	"	25th	"	"	30th	"	" 9 "
"	"	"	31st	"	"	36th	"	" 7 "
After three years . . . . .							"	11 "

The table shows that 44.14 per cent. of the recurrences took place in three months, while after twelve months there were 74, or 15.5 per cent., and after three years there were only 11, or 2.32 per cent. The average period for all cases is 9.4 months. The cases of local reproduction within the first half year were doubtless examples of continuous growth, rather than of recurrence, and merely indicate that the original disease was not thoroughly removed. They, moreover, lead to the belief that, if recurrence does not ensue in that time, the chances for the patient are relatively good, and that the prognosis is all the more favorable as the period of freedom from signs of local contamination prolongs itself. The exceptional cases prove the rule that the patient is safe from reproduction after three years from the date of operation.

In 496 cases in which the point is noted the recurrent local disease was seated—

				Per cent.
In the cicatrix, remains of mamma, or vicinity, alone				in 294, or 59.27
" " " " " and glands				" 117, " 23.59
" glands alone . . . . .				" 77, " 15.52
" opposite breast . . . . .				" 8, " 1.61

Its locality, as influenced by the operation practised in 409 cases, was as follows :

1. Partial or total extirpation of the mamma without the glands, 96 cases :  
 Recurrence in or near the cicatrix 46 cases, or 47.91 per cent.  
 " " the glands alone . 19 " 19.79 "  
 " " cicatrix and glands 31 " 32.29 "
2. Amputation of the breast with extirpation of the glands, 313 cases :  
 Recurrence in or near the cicatrix 235 cases, or 75.08 per cent.  
 " " the glands alone . . 38 " 12.14 "  
 " " both places . . . 40 " 12.77 "

In connection with this table there are two interesting practical facts. In the first place, where the breast and glands are removed the disease reproduces itself, on an average, in 6.4 months, while when the breast alone is extirpated recurrence follows in 7.7 months. Secondly, in the former operation the axillary glands are the seat of recurrence in 25 per cent. of all cases, while they are affected in 52 per cent. of the incomplete operations. Hence, the disease is more grave when the axilla is affected, but by clearing out that cavity in all operations we may naturally expect to diminish, if not prevent, further local dissemination and remove foci of general infection.

A review of the facts contained in the preceding pages in regard to the prognosis of carcinoma or the duration of life, as influenced by permitting the disease to pursue its course without surgical intervention or by endeavoring to stay it by a resort to the knife, leads us to adopt the following conclusions :

That when left to itself carcinoma inevitably kills, by its baneful consequences as a local disease or by its remote multiplication ;

That about one in seven, or 14.24 per cent., of the patients die of the operation itself ; but that the risk is not so great as to forbid interference, since it adds ten months to the life of the patient ;

That operations of all kinds definitely cure 11.83 per cent. of all patients, or nearly as many as they destroy ;

That the patient is safe from reproduction if three years have elapsed since the operation ; and,

That, finally, recurrence may be delayed for several months, or be prevented altogether, by clearing out the axilla at the same time that the entire breast is removed.

*Diagnosis.*—The diagnosis of scirrhus of the breast in its early stages, or before there is implication of the surrounding tissues and the lymphatic glands, is based upon the age of the patient, the average being forty-eight years, the dimpling of the skin, the retraction of the nipple, the immobility of the solitary tumor in the mamma, or, if it be seated at the periphery, its intimate attachment, its nodular outline, its small size, its slow growth, and its stony hardness ; and the diagnosis is strengthened if there were antecedent discharge from the nipple and malignant papillary dermatitis. When the disease has made some progress, or after the fifteenth month of its existence, the adhesion and invasion of the skin, the enlargement and induration of the associated lymphatic glands, the occurrence of ulceration and fixation to the chest, and the impaired nutrition of the patient, constitute a group of signs which can scarcely be mistaken.

Although scirrhous carcinoma is, as a rule, readily diagnosticated, it may be confounded with chronic abscess, gumma, and involution cysts. Thus, a 2-para at the age of thirty-four years was struck on the breast

by her husband. Shortly afterward she observed a hard lump in the upper and outer quadrant, which soon became the seat of sharp, lancinating pains. At the end of three months the swelling was as large as an orange, slightly attached to the skin, and apparently to the lower border of the pectoralis major muscle; the nipple was somewhat retracted, and two enlarged glands were felt in the axilla. After extirpation by one of my acquaintances, incision into the presumed carcinoma disclosed an abscess with thick walls. In a case recorded by Esmarch<sup>1</sup> a tumor as large as a fist, of four weeks' standing, neither tender nor fluctuating, but attended with infiltration of the surrounding tissues, retraction of the nipple, and enlargement of the axillary glands, was diagnosed carcinoma. The tumor would have been extirpated had not the menses appeared, and it burst and discharged pus two days afterward.

In November, 1883, a married woman, aged twenty-eight years, presented herself at my clinic on account of a hard tumor, of four months' duration, seated beneath the areola and to the outer side of the nipple. The skin was seamed, infiltrated, and adherent, the nipple was drawn toward the growth, and the axillary glands were swollen. Careful inquiry elicited a history of syphilis, an abortion at three months, and one at three years, after marriage. Under mixed treatment the tumor promptly disappeared.

Involution cysts have not unfrequently been mistaken for scirrhus, and I, myself, on one occasion removed a cystic breast under the supposition that it was an example of hard carcinoma. In any case of doubtful diagnosis the tumor should, therefore, be cut into before the breast is sacrificed.

From this general course of carcinoma there are certain deviations which may be ascribed to histological peculiarities, since the following study of medullary, colloid, and atrophying cancer shows that the intensity of the disease is modified by structural aberrations. All of these varieties possess certain features in common, but the different degrees of malignity are sufficiently pronounced to warrant a separate examination of their individual characteristics.

**MEDULLARY CARCINOMA.**—Medullary, or tuberos, carcinoma, as it is denominated by Birkett and Bryant, is described by most authors as being enclosed in a distinct capsule; and they distinguish it from ordinary cancer by its occurrence at a comparatively early age, by its more rapid growth and larger volume, by its soft consistence, by the marked enlargement of the subcutaneous veins, by the natural state of the nipple, by the rare and late adhesions and contamination of the lymphatic glands, by the frequent formation of ulcers which protrude bleeding masses beyond the surrounding level, and by its very rapid course.

<sup>1</sup> *Langenbeck's Archiv*, Bd. xxi. p. 627.



While it is true that some of these statements are correct, it is very evident that the life-history of medullary carcinoma is lost in that of medullary sarcoma. Medullary carcinoma is never encapsuled, and the presence of a limiting envelope is, of itself, sufficient to decide against it. The following account of its general pathology is based upon a study of 38 cases derived from various sources, and including 3 of my own:

It occurs as early as twenty-nine and as late as sixty-nine years, the average being 46.8. 35 per cent. of all cases are met with before forty, and 65 per cent. after that age, while 35.29 per cent. occur after fifty.

Medullary carcinoma grows rapidly, and the volume of a child's head in three, five, six, or eight months, or even in five, six, or eight weeks, is not uncommon; but it never attains the bulk which is sometimes witnessed in sarcoma. Its consistence is soft and elastic, or even fluctuating, so that it may be mistaken for an abscess in two-thirds of all cases. In the remaining third the tumor is hard or firm, with a certain degree of elasticity. Like sarcoma, but unlike ordinary cancer, its outline tends to lobulation.

The subcutaneous veins are prominent in 7.89 per cent. of all cases, and the nipple is retracted in 33.33 per cent.

The lymphatic glands are infected in 71.05 per cent. and their taint may show itself as early as three weeks or be delayed for nearly five years.

The skin is discolored and adherent in 33.04 per cent., and it also contains distinct nodules in 5.88 per cent. of these cases. Ulceration is met with in 18.42 per cent., and the sore is deep and excavated and liable to hemorrhage, but it does not fungate.

The tumor is fixed to the chest in 29.41 per cent. of all instances, and in 9.83 per cent. of these circumscribed tubers exist in the pectoral muscles. Both breasts are affected in 5.26 per cent. of all cases.

Of the five cases that ran a natural course, all were dead, on an average, in fourteen months from the first appearance of the disease, the period having been, respectively, five weeks, six weeks, five months, two years, and three years and a half. Post-mortem inspection in two cases disclosed metastatic tumors in the lung and pleura in one, and in the thyroid gland, pericardium, liver, omentum, and kidney in the other.

Of 33 subjected to the knife, further details are wanting in 6, but their average life, up to the date of interference, was twenty months. 6 died from the operation itself. The mean life was twenty-seven months, and the only post-mortem examination that was made showed deposits in the liver and pleura. One patient expired from an unknown cause in twenty-eight months.

Of ten subjects who died with local recurrence after operation, the average life was sixteen months and a half, and the tumor reproduced itself in three months on an average. In the single post-mortem section the liver, stomach, and ovary were found to be occupied by secondary growths. In one case death was due to metastases, but there was no recurrence, while in another case the patient was alive with local return.

Two died of an intercurrent affection, without recurrence, at the end, respectively, of eighteen months and nine years and ten months, their total life having averaged eight years and three months. Six were alive and well, respectively, for sixteen months, nineteen months, twenty-four months, four years, four years and ten months, and five years and six months after operation, and their mean life from the first observation of the disease was three years and a half. In all of these cases, with one exception, infected glands were also removed.

From the foregoing account it follows that, after the atrophying form, medullary carcinoma is the most malignant of all the tumors of the mamma, since the glands are infected in 71 per cent.; local recurrence ensues within three months after removal in 55 per cent. of all cases; metastatic growths are always discovered on post-mortem inspection, and are preceded by taint of the glands of the axilla in three-fourths of the instances; and the total duration of life without surgical intervention is only fourteen months, or one year and a half shorter than that of any of the other varieties of carcinoma. Life may be prolonged, however, and a positive cure result in 20 per cent. of all cases, by an early resort to the knife, even if the axillary glands are extensively contaminated.

The distinction between medullary carcinoma and medullary sarcoma may be made by paying attention to the following points: A soft, rapidly-growing tumor, occurring before the twenty-ninth year, warrants the exclusion of carcinoma. No matter at what period of life the tumor may develop, a discharge from the nipple, freedom from retraction of that body, infection of the glands, invasion of the skin, and fixation to the chest almost conclusively point to sarcoma; and if the tumor be the seat of a fungating ulcer, the diagnosis is confirmed if the protruding mass be not attached to the surrounding skin.

COLLOID CARCINOMA, as based upon a critical analysis of 22 cases, is distinguished by its chronic course, by its less frequent local dissemination and infection of the glands, and by the protracted appearance of metastatic deposits, features which make it the least malignant of the cancers. Its comparative immunity from local and general dissemination may be ascribed to the biological changes in its cells, the greater portion of the protoplasm of which is converted into colloid material, which acts the part of an intercellular substance and prevents

or retards the migration of the cells into the adjacent tissues and their transference along the lymphatics to the associated glands and the viscera.

It is met with as early as twenty-seven and as late as sixty-six years, the average being forty-seven; 81.82 per cent. occur after the fortieth year, and 50 per cent. after the age of fifty.

It increases very slowly, and the volume of a fist is exceptional, that of a hen's egg being the rule, and it may require fourteen years to attain that size.

Its consistence is hard, only 4.54 per cent. being soft and elastic, and then only at the more prominent bosses. Its outline is nodular.

The subcutaneous veins are somewhat prominent in 13.63 per cent. The nipple is retracted in 30.72 per cent., and discharges a bloody fluid in 9.09 per cent. The glands are infected in 54.54 per cent. The skin is adherent in 22.72 per cent., and it also contains distinct nodules in 13.63 per cent. Ulceration is met with in 13.63 per cent. The tumor is fixed to the chest and the pectoral muscles are pervaded by tubers in 13.63 per cent., and both breasts are involved in 9.09 per cent. Pain is experienced in 36.36 per cent.

Of the 3 cases that ran a natural course, 2 died at the end of twelve years, and 1 in eleven years, from the first observation of the disease. In all the glands were involved. In 2 the entire skin of the chest was pervaded by nodules, thereby constituting cancer en enirasse, and secondary deposits were found in all.

In 2 death resulted from the operation. In 1 there was no section, but the disease had existed for ten years, while in the second, of twelve years' standing, metastases were present.

In 6 there is no further history after operation, but the tumor had existed, on an average, for twenty-eight months; 1 patient died without recurrence from an unknown cause seventeen months after operation.

In 2 cases the patients were alive with recurrence, the total life having averaged thirteen years and six months; 3 subjects were dead with recurrence, and their average life was twenty-six months. In the former the glands were not infected, while they were invaded in the latter.

In 5 cases the patients were still alive and free from recurrence; in 3, respectively, for nineteen, twenty, and twenty-four months, and the disease had existed, on an average, for six months before operation; and in 2 there was no recurrence in three years and in five years and ten months, and the disease had existed, on an average, for nine months before surgical intervention. Hence these patients may be regarded as cured. In this class of cases in only 1 were the axillary glands invaded, and the subject was well at the end of two years.

From these facts it will be seen that one-half of the cases recur after operation, and that, although the disease requires eleven years and eight months to run its course when uninterrupted by operation, it is impossible to calculate what effect operation has on prolonging life. The most that can be said is that in the cases in which the history is complete the patients were still living upward of forty months after operation, and that the disease had existed previous to operation thirty-two months, and that 15.38 per cent. of the subjects are cured by surgical intervention.

**ATROPHYING SCIRRHUS.**—Withering, or atrophying, scirrhus is usually stated to pursue a milder course than the other forms of carcinoma as regards glandular and visceral participation; and this assumed attribute is said to arise from its tendency to result in a natural cure. While it is certainly true that the older portions of the tumor do undergo cicatricial contraction and atrophy, it is none the less true that, so far from nature effecting a cure, the surrounding tissues are simultaneously being invaded to a far greater extent than is met with in any other variety of cancer, although infection of the glands is not so common. In point of fact, withering scirrhus evinces signs of local and general extension to so wonderful a degree that recurrence after operation is met with in seven-tenths of all cases, and post-mortem inspection has never failed to disclose visceral deposits. The recurrent disease is, moreover, more intense than in any other cancer, taking place in three-fourths of all instances during or soon after cicatrization, and showing itself in the glands and as tubers in the skin, subcutaneous connective tissue, and pectoral muscles. In one case, indeed, the entire course of the disease was only seven months, and two operations for recurrence, the second having been a most extensive one, were practised. In one case of death from operation secondary deposits were found in the liver, and the disease had existed only five months in a woman of fifty-five years. In still another example, in which the disease developed at the forty-fourth year, on death without operation in one year metastases were found in the lungs, pleura, and liver. From a study of forty-five cases, which include ten of my own, I can find nothing to confirm the idea that the course of the disease is more rapid when it develops early than late in life.

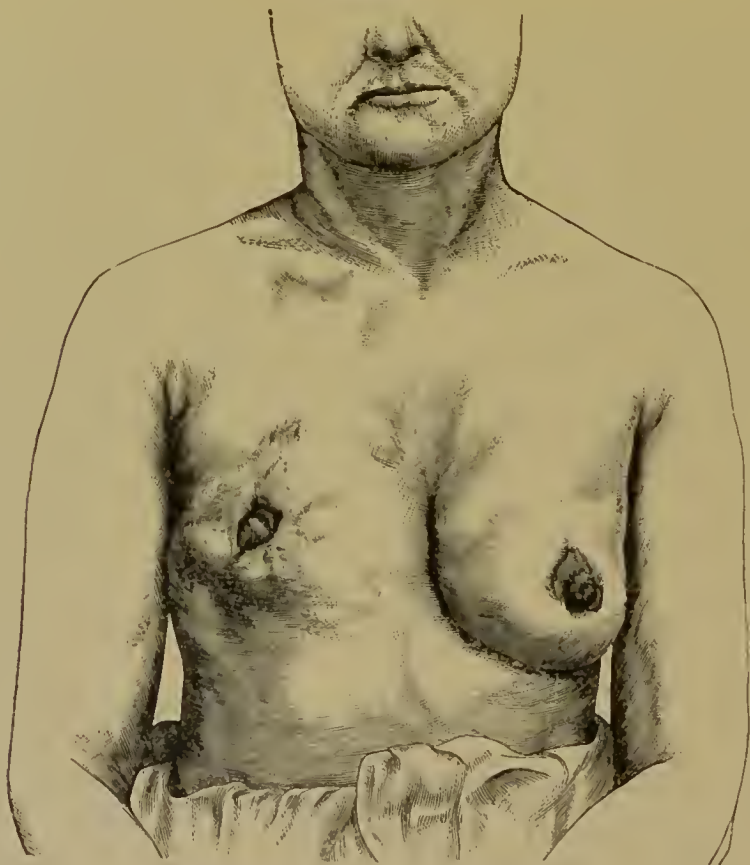
Although patients may live many years, even for thirty years, they none the less surely die from its effects, and the longer it lasts the more liable are the adjacent tissues, glands, and the viscera to extensive infection. Thus, I have recorded a case,<sup>1</sup> the structural features of which are represented in Fig. 44, in which the tumor first showed itself at the age of forty-six years, and on death, seventeen years later, the skin of the corresponding mammary and scapular regions and of the oppo-

<sup>1</sup> *Philadelphia Medical Times*, vol. viii. p. 84.



site breast, and at the base of the xiphoid cartilage, was pervaded by lenticular nodules; the axillary portions of the pectoral muscles were converted into densely hard masses; the glands of the corresponding axilla and supraclavicular fossa and of the left axilla were enlarged and indurated; and both lungs, the pleura, the bronchial and mediastinal glands, and left half of the diaphragm, and one kidney, were beset with metastatic deposits. In a second case, the external features of which are shown in Fig. 56, and the minute appearances of which

FIG. 56.



Atrophying Scirrhus of the Right Mammary Gland.

are depicted in Figs. 41 and 45, I removed, on account of excessive suffering, a tumor of fourteen years' duration, which had commenced at the age of thirty-one. Not only was the pectoral fascia itself infiltrated, but the subjacent muscle was so extensively occupied by nodules as to demand the removal of its larger portion. The axillary glands formed a densely hard tumor which extended up under the clavicle, and, as it was intimately attached to the axillary vessels and nerves, I was obliged to leave a portion in the wound.

Withering scirrhus occurs as early as twenty-nine and as late as

sixty-five years, the average being forty-nine, or somewhat later than the other varieties of carcinoma. 14.28 per cent. develop before the fortieth year, and 85.72 per cent. after that age, of which more than one-half occur after the age of fifty.

Its consistence is densely hard, its volume is exceedingly small, and its outline is nodular, knotty, and irregular.

The subcutaneous veins are never enlarged, but the nipple is always retracted.

The lymphatic glands are infected in 56.81 per cent. of all cases; the skin is adherent in 45.45 per cent., contains nodules in 11.36 per cent., and is ulcerated in 34.09 per cent. of all instances.

The tumor is fixed to the pectoral fascia, and in the majority of cases closely, in 39.29 per cent., and nodules are disseminated in the pectoral muscles in 29.77 per cent. of all cases. The opposite breast is invaded in 1 case out of every  $22\frac{1}{2}$ .

Of 12 cases that pursued a natural course, 4 were living, their average life having been fourteen years and nine months; 4 were dead, their average life having been six years and ten months, and in 4 there was no further history, their average life having been thirty-seven months. In 2 of these cases post-mortem examinations were made, and they disclosed metastases in the lungs, pleura, and liver in 1, and in various organs, as I have indicated above, in a case of my own.

Of 33 cases that underwent operation, 2 died of its consequences. In 1 the total duration of the disease was five months, and secondary tumors were found in the liver. 10 died with recurrence, 2 of recurrence and metastases, and 1 of presumed metastases, and their average life was ninety-three months; 5 were still living with recurrence, forty-two months having elapsed, on an average, since the first observation of the disease, and 1 recurred, but further details are wanting. 5 remained well, 1 for seven years, 1 for five years, and 1 for three years and eleven months, or for eighty-four months, on an average, from the first detection of the disease, while 2 were well for twenty months each, their mean life having been thirty months and a half. In 2 of these subjects the skin and axillary glands were infected. In 7 cases the history ceases with recovery from the operation.

Hence, in the cases in which the histories are complete the disease recurred in 70.83 per cent., and metastatic tumors were found in the 5 cases in which the body was opened after death. In point of malignity, therefore, although its course is essentially chronic, atrophying scirrhus is the most pernicious of the tumors of the breast, although operations cure 11.53 per cent. of all cases.

*Treatment.*—From the great frequency of mammary carcinoma, and its inevitably fatal termination if it be permitted to pursue a natural course,

there is no subject within the entire domain of surgery of more importance than that of its treatment. In discussing this question we fancy that it will not be denied that the management should be based solely upon principles deduced from a careful study of pathological facts and the results of surgical intervention, and not upon the old theory of the constitutional nature of the disease. Carcinoma is now held to be primarily a local growth by all leading pathologists, with the probably solitary but conspicuous exception of Sir James Paget, and the day has passed for the physician to declare that a tumor was not a cancer because it did not recur after removal. These truths cannot be too forcibly or too frequently impressed upon the laity and the family attendant; and the sooner women learn that the disease can be cured by early and adequate operation, the better it will be for their sex and the greater will be the credit accruing to our art.

In our study of the clinical course pursued by the affection it has been pointed out that, with its advance, its malignant attributes manifest themselves, first, by local or regional dissemination; secondly, by infection of the associated lymphatic glands; and, thirdly, by the development of secondary growths or deposits in the various tissues and organs. Hence, our aim should be to prevent these disastrous occurrences by a resort to the knife, which is the only measure upon which reliance can be placed.

That surgical intervention does prevent, to a certain extent, the invasion of the paramammary fat and connective tissue, skin, and subjacent muscles of the chest is shown by the following facts: Observation during life and during operations indicates that the contiguous structures are infected in 82.95 per cent. of all instances, while of 1036 operations there was local reproduction in 692, or 66.80 per cent. Hence, extirpation precludes continuous invasion of the surrounding tissues in 16.15 per cent. of all cases.

The influence of operations upon the prevention of gland infection is most decided. Thus, of 1638 cases, the glands were palpable in 1115, or 68.07 per cent., when the patient first came under observation, while of 496 operations in which this point is noted, the recurrent disease was seated in the glands in 194, or 39.11 per cent., or in 28.96 per cent. less than when the affection was not interfered with. It is, moreover, noteworthy that glandular recurrence was more frequent by 27 per cent. when the breast alone was removed than when it was extirpated along with the contents of the axilla.

Not less striking is the influence of operations upon the obviation of secondary visceral growths. Thus, of 256 patients dead of carcinoma in whom the disease pursued a natural course, metastatic tumors were discovered in 158, or 61.71 per cent. Of 838 dead after operation, on the other hand, secondary deposits were found in 286, or 34.12 per cent.,

so that operations prevent implication of the internal organs in 27.59 cases out of every 100.

Having thus seen that the removal of the breast frustrates to a great extent regional, glandular, and general infection, it is not surprising that operations should, as has been already pointed out, not only prolong life by ten months, but, in addition, bring about a cure in nearly 12 per cent. of all cases, in six-tenths of which the glands were implicated, and in one-ninth of which the recovery was permanent after extirpation of recurrent growths. When, in addition to these complications, it is considered that in these cases the disease had already existed, on an average, for 13.3 months, and that seven-tenths of the operations must be regarded as having been inadequate to remove all the affected tissues, the success is remarkable, and justifies the inference that early and thorough operations will greatly increase the ratio of cures. In point of fact, the results of free excision of the breast, along with extirpation of the axillary contents, in every case indicates that the cures may be nearly doubled. Thus, of 115 cases in which the result was ascertained from the practice of Mitchell Banks and myself, 24, or 20.86 per cent., were permanently successful. If these be deducted from the remainder, the latter yield only 10.99 per cent. of cures, thereby showing the great advantage of attacking the axilla in all cases.

The rule to remove the axillary contents in every case should be absolute. In not a few instances infected glands cannot be detected prior to operation, but none the less must the rule be observed. The vast importance of attending to this step of the procedure is shown by the following facts: In 16 of my own cases the glands could not be felt from without, but in 14 of these they were present when the axillary space was explored. Hence, my experience indicates that the glands may be expected to be implicated in 87.5 per cent. of all cases in which they are not palpable through the coverings of the axilla. In Kuester's<sup>1</sup> practice the proportion of glandular involvement under similar circumstances was somewhat larger, as his last 65 cases indicate infection in 57, or 92 per cent.

The results that I have indicated have not been obtained without a considerable mortality, since of the 1390 operations, 198, or 14.24 per cent., were fatal from the immediate effects of the procedure. The reason for this high rate of death is to be found in the defective manner in which the axillary wound was managed in a large proportion of cases in preantiseptic days, through which hemorrhage, erysipelas, septicæmia, and pyæmia were common occurrences. Banks, one of the latest writers on the subject, lost 10 out of 82 cases, in which the breast and axillary glands were extirpated, from septic surroundings. My own 43 operations, which were done up to May, 1887, and

<sup>1</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xxxvi. p. 143.



which were more extensive than those of Banks, afford 2 deaths—1 from fat embolism and 1 from pneumonia; and of 10 additional cases in the hands of my colleagues in the Jefferson Medical College Hospital, all recovered. Hence, my mode of operating, which will be described presently, has yielded a mortality of only 3.7 per cent. Billroth's operations for the removal of the breast and glands in pre-antiseptic days were attended with a death-rate of 21.3 per cent., while the mortality under antiseptic precautions was only 10.5 per cent.;<sup>1</sup> and there is every reason for believing that the future mortality of radical procedures will not exceed 6 or 7 per cent., provided the operation is strictly aseptic. Kuester's<sup>2</sup> last 96 cases, indeed, were attended with only 5 deaths, or a fatality of only 5.2 per cent. Even if the mortality should remain at 14.24 per cent., operations should be considered perfectly justifiable, since in destroying that number it is to be remembered that they cure 12 women out of every 100. This statement applies to all sorts of operations; but the proportion of cures to deaths becomes the more striking if we consider those cases only in which thorough operations were practised. Thus, of 257 examples of extirpation of the breast and axillary contents from the practice of Banks, Kuester, and myself, 12.06 per cent. perished and 19.38 per cent. were cured.

In no operation for malignant growths is the requirement to go far beyond the apparent limits of the disease so urgently demanded. This is shown not only by the pathological facts as to regional dissemination and the common recurrences after operation, but also by the anatomy of the healthy gland. The normal limits of the breast are very uncertain. Small, scarcely perceptible lobules frequently lie at some distance from the main body of the gland, particularly in the axilla and just below the clavicle. In one case I found an affected portion near the shoulder, and it would not have been discovered in the ordinary methods of operating. It is for these reasons, as well as on account of the want of success that attended my earlier partial and incomplete operations, and the fact that the experience of centuries has demonstrated that recurrence takes place in the tissues that are left behind in the old operation, that for nine years I have amputated the entire breast with its coverings, and invariably cleared out the axilla. In the old operation, shown in Fig. 243, the nipple and a portion of the skin are included in two oval incisions, the flaps are raised, the mamma is then rapidly dissected or torn from the pectoral fascia, the vessels are secured, a drainage tube is inserted, and the edges of the wound are united with sutures. The surgeon congratulates himself upon having done a neat bit of work, and the patient is pleased with the rapidity of her recovery. But beneath the flaps so neatly apposed are hidden the germs of

<sup>1</sup> *Op. cit.*, p. 155.

<sup>2</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xxvi. p. 147.

recurrence in the fat and pectoral fascia that remain behind, and in the lobules, which I have more than once seen operators overlook. In these cases axillary glands were also removed if they were felt prior to operation; but the surgeon was unmindful of the fact that many glands

FIG. 57.



The Ordinary Method of Removing a Carcinomatous Breast.

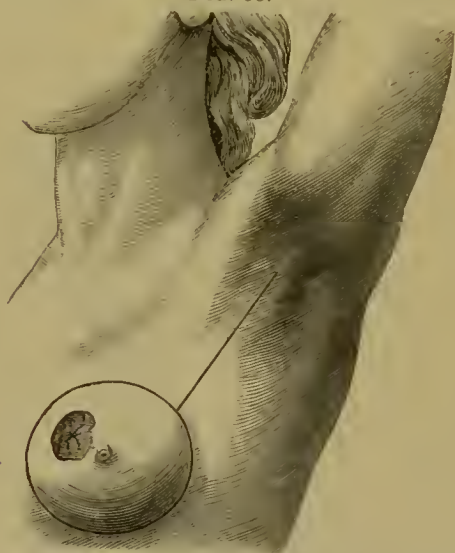
might be buried in the axillary fat, where they could have been detected if the incision had been prolonged and the finger had even carelessly searched for them. Such is the ordinary procedure of ridding a woman of so formidable a disease; such is the operation which has cast an opprobrium on surgery from which it will take many years to recover; such is the operation which we have to thank for the large percentage of recurrences, for the fatal progress of the disease, for the great injustice done our patients, and for the harmful impression made upon the laity, and not a few of the profession, as to the inutility of interference.

In exceptional cases, as when the patient's life is threatened by repeated bleeding, by exhausting and offensive discharges, and by great suffering, the partial operation is eminently proper to afford temporary relief. If the aim, however, be to effect permanent riddance, the knife must be employed with no sparing hand; all tissues, namely, the skin, paramammary fat, the entire gland, pectoral fascia, and axillary contents, which long and accumulated experience has demonstrated to afford the seats of recurrence, must be freely extirpated.

With this object in view, even in the most favorable of all cases, or one in which the tumor is of moderate volume, no matter what its situation may be, and devoid of superficial and deep attachments, and the glands cannot be felt before operation, the procedure to which I have

resorted in 43 cases, and which is delineated in Fig. 58, may be thus outlined, strict aseptic precautions being observed throughout.

FIG. 58.



The Method of Operating for Carcinoma of the Breast, as practised by myself.

The entire mammary region having been carefully palpated while the patient is supine, in order to discover any outlying lobules should they exist, a line is drawn with an aniline pencil around the entire circumference of the breast as a guide for the knife. If the tumor be peripheral, the incision must extend for at least one inch beyond its apparent limit. A stout large knife is then carried along the line down to the pectoral muscle, spirting vessels are temporarily controlled with the fingers of the assistant, or with clips, or forepressure forceps, and the breast is removed along with the pectoral fascia, through which the muscle is exposed as if for class-room demonstration. The vessels having been permanently secured with catgut ligatures, the fat around the line of the incision is carefully explored for any outlying nodules of disease, a precaution the observance of which will be made apparent when I state that in three of my cases they were found, thereby showing to what extent the disease may disseminate itself even in apparently simple cases. Any remaining nodules having been removed, the pectoral muscle is now carefully examined with the eye and fingers for nodules. If present they should be freely removed and the wound seared with Paquelin's cautery. The large exposed surface having been protected with an asepticized towel, the arm is carried outward and upward to rather more than a right angle with the trunk, and an incision is prolonged into the axilla about three-quarters of an inch below the lower border of the great pectoral muscle, through which the deep fascia is opened to the same extent as the cutaneous wound.

If there happen to be a number of small glands or two or three large ones, and they are not united to the surrounding tissues, their removal, along with the entire fatty contents of the axilla, can easily be effected with the fingers and scissors. When, however, as more frequently happens, the glands and other axillary contents are converted into an inseparable mass, they will have to be dissected out with the knife and scissors curved on the flat. In performing this step of the operation the lower portion of the mass and that which adheres to the side of the chest and pectoralis minor, and surrounds the intercosto-humeral nerve and other superficial nerves, should first be separated, and we should carefully work our way up to the apex of the space, including every vessel, arterial or venous, between the two ligatures before dividing it. Unless this precaution be observed, large venous trunks are liable to be cut or lacerated close to their points of entrance into the axillary vein, an accident which will be followed by troublesome hemorrhage. The most difficult part of the operation is the separation of the glands from the axillary vein as it lies under the pectoral muscle. In many cases this can be effected with the finger-nails, the arm having been brought toward the trunk; but when they are firmly incorporated with the vein, provided the adhesion exists to a limited extent, the corresponding portion of the vessel should be removed between two ligatures. Glands which are attached to the vein immediately beneath the clavicle are best reached by carrying an incision in the interval between the sternal and clavicular origins of the pectoralis major muscle, as in the operation for ligation of the first portion of the axillary artery. Such a procedure will do away with the necessity for division of the pectoralis muscle, which is recommended by Verneuil.<sup>1</sup> When the glandular involvement is very extensive, to afford more room Esmarch<sup>2</sup> favors amputation at the shoulder-joint, but such an extreme measure is, in my opinion, useless, as it will be found that all diseased tissues cannot be removed. Finally, the mass is brought down and the dissection continued until it is separated from the posterior boundary of the axilla, great caution being exercised lest the subscapular artery, vein, and nerves be injured, thereby avoiding hemorrhage and impairment of the movements of the arm. Should the axillary vein be wounded, if the injury be slight, hemorrhage may be arrested by including the opening in the grasp of forcipressure forceps, which, as I know from experience, need not be retained longer than two days; should the injury, however, be extensive, a ligature should be cast around the vessel on each side of the opening.

The parts are now thoroughly irrigated with the 1 : 1000 solution of corrosive sublimate, and the edges of the wounds are brought as

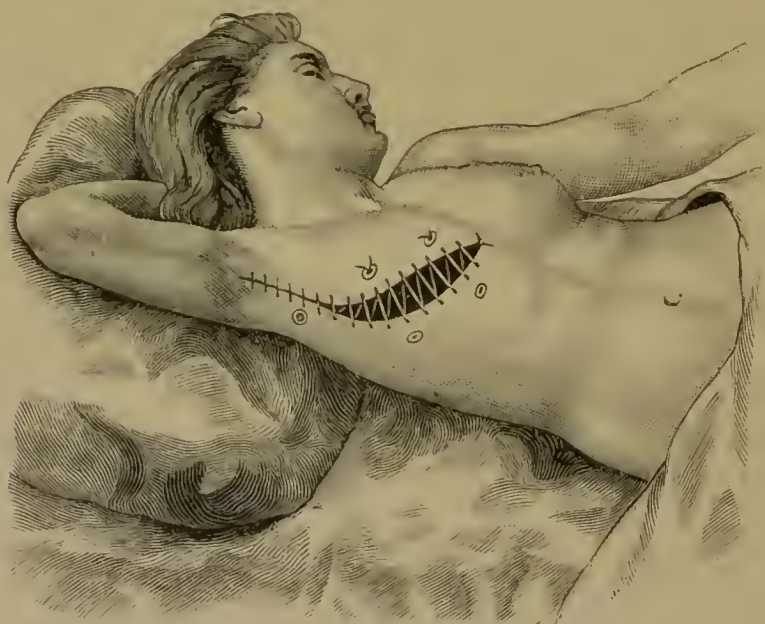
<sup>1</sup> *Gazette des Hôpitaux*, 1879, p. 955.

<sup>2</sup> *Deutsche med. Wochenschrift*, No. 17, 1883, p. 258.



thoroughly as possible into apposition. If the breast flaps be raised from the subjacent parts for an inch and a half or two inches, one will be astonished to find how nearly the wound may be closed in corpulent women with large breasts, in whom before approximation the exposed surface was as large as a dessert plate, and how accurately the wound can be united in thin women with small breasts. In the former class of patients I first insert two or three of Macewen's button sutures at the bases of the flaps, and then approximate the free edges with the continued suture. In this way the edges of the largest wounds may be brought so nearly together that a space not exceeding two fingers' breadths in width will have to unite by the process of granulation. A hole having been punched through the most dependent portion of the posterior axillary flap, into which a glass drainage tube is inserted, the edges of the axillary wound are coaptated by the continued suture, the material for the suture being heavy sublimate silk. These points are shown in Fig. 59, but the edges of the breast wound are repre-

FIG. 59.



Mode of Approximating the Edges when the Wound cannot be Entirely Closed.

sented too far apart. When it is possible to bring together the edges of the wound, a drainage tube is employed; otherwise it is not required. Before applying the outer dressings, a description of which is unnecessary, both wounds are again thoroughly washed out with the corrosive solution. The drainage tube is removed at the end of twenty-four hours, and the stitches are taken away on the eighth day. If the wound has been a partially open one, moist antiseptic gauze is

continued until it has fully cicatrized, which requires from four to six weeks.

When, as usually happens, it is possible to bring the edges of the wound in apposition, it is closed with the continuous chromicized catgut suture, and painted over with iodoform collodion. At the expiration of eight or ten days, when the crust will have become detached, the union will be found to be perfect.

Such is the radical operation which I have practised for some years, so radical, indeed, that I fear that, for the present, it will not gain many adherents. Thus, in a discussion on immediate reunion in amputation of the breast, at the Société de Chirurgie,<sup>1</sup> 1885, Lucas-Championnière, Polaillon, Marc Sée, Tillaux, and Trélat declared against free removal of the skin, and Polaillon even went so far as to assert that it did not influence recurrence. Verneuil and Després, on the other hand, were in favor of removing the skin largely, and leaving a partially open wound, through which, the drainage being excellent, erysipelas and other wound complications were prevented. In the remarks on Banks' paper at the Harveian Society,<sup>2</sup> in the spring of 1887, in which that surgeon reported 82 cases of extirpation of the breast along with the axillary contents, Bryant and Butlin questioned whether the complete operation afforded better results than the incomplete, and Butlin,<sup>3</sup> Pick, and Cripps held that clearing out the axilla in every case was neither necessary nor judicious, although Pick asserted that the skin should be freely removed. Owen was the only member who gave cordial support to the procedure urged by Banks, the prevailing opinion being that the operation was attended with an excessive mortality and did not lessen the risk of recurrence.

The preceding views enunciated by practical surgeons are entirely theoretical. Let us turn from surmise to an analysis of facts. I have already stated that the mortality of my operation, which is more extensive than that of Banks, and of which nearly one-third were not aseptic, is only 3.7 per cent., although in addition to the removal of the entire breast with its coverings and evacuating the contents of the axilla, large portions of the pectoral muscle were excised in 1 case out of every 7. It has already been pointed out that of 313 amputa-

<sup>1</sup> *Gazette des Hôpitaux*, Nos. 4 and 7, 1885.

<sup>2</sup> *British Medical Journal*, March 12, 1887, p. 572.

<sup>3</sup> In his recent work on *The Operative Surgery of Malignant Growths*, Butlin enters fully into the question of clearing out the axillary contents, and asserts that the axilla should on no account be interfered with unless the glands are obviously enlarged. Had so good a pathologist as Butlin been in possession of the facts derived from my practice and that of Kuester, he would scarcely have given utterance to so pernicious a doctrine, a doctrine which we fear will so influence English surgeons as to counteract in great measure the recent advances that have been made in the treatment of carcinoma of the breast.

tions of the breast as ordinarily practised, combined with extirpation of the glands, the recurrent growth was seated in or near the cicatrice in 235, in the glands in 38, and in both situations in 40; in other words, recurrence was met with in the remains of the breast tissues in 275, or 87.86 per cent. Included in these figures are my own cases. If these be deducted, amputation of the breast as usually done, with clearing out the axilla, demonstrates that in 94.47 per cent. the disease recurred in or near the cicatrice, while my cases show only 30.55 per cent. of recurrences in that locality, the percentage of immunity from local reproduction being in favor of my procedure by 63.92 per cent. In addition to these advantages, I have obtained 21.05 per cent. of cures.<sup>1</sup> These are facts, not mere expressions of opinion; and until some other operation is brought forward that will show a still further diminished mortality, a smaller proportion of recurrences, and a greater number of permanent recoveries, I contend that the procedure that I practise is the most successful and most rational that has as yet been devised.

Although my mode of operating has afforded better results than that practised by any other surgeon, a study of the cases of Banks, whom I have seen operate, and who does not remove as much of the skin as I do, shows that he met with 32.83 per cent. of recurrences and obtained 20.85 per cent. of cures, so that his results are nearly as good as my own. On this account I felt as if I had possibly sacrificed too much of the integument; and I have in four recent cases so far modified my operation, the skin in none being apparently affected, as to save a sufficient amount of that structure to admit of bringing the wound nicely together without tension. These four cases can be followed, and whenever I feel assured that I will be able to trace my patients I intend giving this procedure a fair trial. When, however, the subject lives at a great distance or is too poor to return in the event of recurrence of the disease, I will adhere to the more sweeping procedure.

When the contents of the axilla form a large, hard, nodular tumor,

<sup>1</sup> Of my 43 operations, 2 were fatal; 5 patients were lost sight of after recovery; the disease recurred in 16; and 20 subjects remain well or perished from other affections without recurrence. Of this last class, 8 were cured; so that of 38 cases in which the history could be traced, 8, or 21.05 per cent., were examples of permanent recovery. Of these, 1 lived for seven years and ten months, while the remainder are still doing well, 1 for eight years and seven months, 1 for eight years and six months, 2 for six years and three months, 1 for three years and nine months, 1 for three years and five months, and 1 for three years and one month after operation. The next best results have been attained by Banks, Estlander, and Kuester, who cured, respectively, 20.85, 20, and 17.85 per cent. of their cases. Other surgeons who have recorded a higher rate of cures do not include the fatal cases in their calculations, but base their rate on the number of patients who have recovered from the operation. Such an estimate is manifestly incorrect.

and the disease has existed for some time, before amputating the mamma I make it a rule to attack the axilla first, since in many of these cases it will be impossible to remove the entire disease even if the surgeon were to excise the vessels and the axillary plexus of nerves to which the mass adheres. If all diseased tissues cannot be extirpated, nothing further is done. In such cases excision of the breast prior to attempts to extirpate the axillary mass involves an unnecessary operation. Should the supraclavicular glands be invaded, I always cut down upon them first and remove them, if they be superficial. Should they be deep and surround the large vessels and nerves, attempts at their removal would be not only dangerous, but useless.

In atrophying scirrhus of several years' duration; in any variety of carcinoma in which the attachments involve the entire mammary region; when nodules are extensively disseminated over the surface of the chest; in the cuirass form of carcinoma; when immobility of the arm, œdema, and pain indicate that the vessels and nerves of the axilla are intimately connected with the mass; and when there are indications of visceral implication,—the disease has advanced so far that radical operations are unjustifiable. Implication of both breasts is not a contraindication.

In cases unfit for operation life must be rendered endurable by the relief of pain, the arrest of hemorrhage, and the correction of fetor. If the suffering be great, it may be allayed by the hypodermatic injection of morphia and atropia, repeated as often as may be required. When the pain is increased by the rapid growth of the neoplasm, during which the breast is hot, tense, and tender, nothing mitigates it so rapidly as the local application of a strong solution of acetate of lead, or of bags of ice. When the active symptoms have subsided these measures may give way to the application of an ointment composed of a drachm each of extract of belladonna and extract of stramonium to the ounce of lanolin. Œdema of the arm should be met by massage, elevation, and a flannel roller. Hemorrhage may be controlled by styptic cotton, although excision of the breast may be required if it recurs and threatens life. As a deodorizer, I have found that a 1 per cent. solution of chloral hydrate, or a 3 per cent. solution of citric acid, both of which remedies also possess the merit of assuaging pain, answers a better purpose than the germicidal antiseptics. Should the tumor be sloughing, it should be freely sprinkled with iodoform and dressed with sublimate gauze.

With regard to general measures, it need only be stated that the diet should be nutritious and assimilable, and that the strength should be supported by alcohol and appropriate tonics.



## CYSTS.

A cyst may be defined to be a fibrous sac filled with more or less fluid contents, which is formed independently of the neoplasms of the mamma. Hence, the cysts under consideration must be carefully distinguished from the softening and extravasation cysts which are of not infrequent occurrence in the neoplasms properly so called, and from the retention cysts which are so commonly found in connection with fibroma, sarcoma, myxoma, and adenoma. The former constitute cystoid, and the latter cystic, tumors.

The ordinary clinical classification of cysts is entirely artificial and affords no clue to their derivation, as it is based upon the nature of their contents. In accordance with their mode of origin cysts may be classified, first, as glandular or epithelial, which result from the accumulation of the secretion and dilatation of the acini and ducts, and which are known as mucous or retention cysts; secondly, as connective tissue, endothelial or lymphatic, which arise by the expansion and fusion of the interfibrillar lymph spaces of the periglandular connective tissue, and which are ordinarily termed serous cysts; and, thirdly, as cysts formed around the embryos of the *tænia cœlinococcus*, and which are designated hydatid cysts. In the glandular variety the sac is lined by the epithelium of the secreting apparatus; in the lymphatic variety the lining is endothelial; while in the hydatid cyst the capsule is merely fibrous, without either an epithelial or an endothelial investment.

The independent formation of a cyst around a fibrous coagulum has been recorded by Schuh<sup>1</sup> and Gay.<sup>2</sup> Albers<sup>3</sup> has described a dermoid cyst containing hair and sebum, and supposed sebaceous cysts, which were probably nothing more than inspissated lacteal cysts, have been removed by Gerdy,<sup>4</sup> Laurence,<sup>5</sup> and Dieffenbach.<sup>6</sup>

Excluding the formations referred to in the preceding paragraph, mammary cysts may be simple or multiple, unilocular or multilocular, and may affect one or both glands. Although they are of quite common occurrence, they are, when compared with the neoplasms, very infrequent, as they constitute less than 2 per cent. of all tumors of the breast.

## 1. GLANDULAR OR RETENTION CYSTS.

When from any cause whatever the lacteal ducts are obstructed, constricted, or obliterated, the glandular apparatus behind the lesion is converted into a sac through retention and accumulation of its more

<sup>1</sup> Klebs: *Handb. der Path. Anat.*, p. 1197.

<sup>2</sup> *Boston Med. and Surg. Journ.*, 1878, p. 90.

<sup>3</sup> *Erläuterungen*, Bd. iii. p. 589.

<sup>4</sup> Velpeau: *Diseases of the Breast*, Syd. Soc. ed., p. 247.

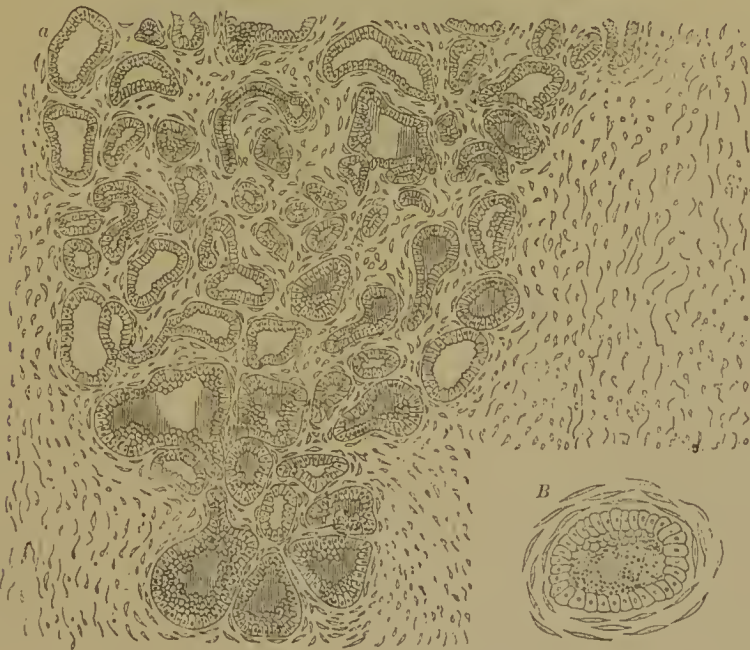
<sup>5</sup> *Ibid.*, p. 248.

<sup>6</sup> Lebert: *Bull. de la Soc. Anat.*, 1852, p. 42.

or less altered secretion, thereby giving rise to the retention, glandular, or epithelial cyst. The affection may arise from malformation of the nipple; from inflammation due to injury or puerperal mastitis; from the presence of small vegetations in the ducts;<sup>1</sup> from cicatricial contraction of the fibrous stroma of the mamma; from errors of development during the unfolding of the gland after the establishment of the menses, through which, as Meckel suggested, the lobules form more rapidly than the ducts; and, finally, from perverted activity of the secreting apparatus, the exciting cause of which is often obscure.

From a careful minute study of ten breasts, I am convinced that retention cysts, particularly those which occur after the menopause, develop principally as the result of morbid changes in the epithelium of the acini, although the ducts do not escape. The epithelium proliferates and accumulates in the acini, through which the latter are more or less closely packed with angular and polyhedral cells. The cells then undergo retrogressive changes, by which they are converted into a lactescent or mucoid fluid, so that a single acinus appears as an

FIG. 60.

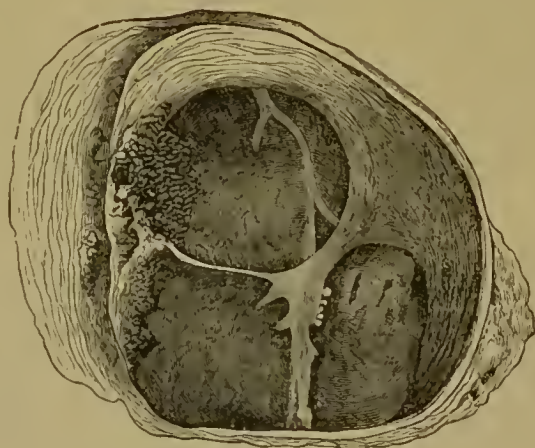
Multiple Retention Cysts. *a*,  $\times 70$ ; *B*,  $\times 240$ .

enlarged ovoid or round cavity surrounded by its membrana propria invested by a layer of cuboid or cylindrical cells. As a rule, all the acini of a lobule participate in these alterations, as is well shown in Fig. 60, from Labbé and Coyne, which represents multiple cysts

<sup>1</sup> Rogeau: *Bull. de la Soc. Anat.*, 1852, t. xlix. p. 108.

forming as the result of cicatricial contraction of the interlobular connective tissue. The cyst increases in dimensions by the fusion or coalescence of the contiguous acini, as is frequently demonstrated by the projection of the remains of the septa or partition walls, in the form of irregular connective tissue papillæ, into the common cavity. These processes sometimes persist and enlarge, so that the inner surface of the cysts is here and there studded with minute, soft, vascular, microscopic excrescences, which impart to it a villous appearance. In the larger multilocular cysts the intersecting bands are greatly thickened, as shown in Fig. 61, from Virchow.

FIG. 61.



Multilocular Retention Cyst.

For convenience of description, glandular or retention cysts may be divided into the simple, which comprise the so-called mucous, sero-sanguinolent, and hæmatic, and the lacteal, which include the oil and butyroid cysts of various authors.

*A. Simple Cysts.*—From an analysis of 70 cases of simple cysts, including 10 under my own care, I am enabled to present the following salient features of their pathology: They constitute globular, ovoid, or pyramidal tumors, which vary greatly in size, considerable volume being exceptional, and the contents of which, no matter what their physical appearances may be, are always albuminous—a point which suffices to differentiate them from the connective tissue cysts. The tumor is single in 50 per cent., and multiple in an equal percentage of all instances, while one breast is involved in 65.71 per cent., and both breasts are affected, simultaneously or successively, in 34.28 per cent. of all cases. The disease is met with as early as the fifteenth and as late as the sixty-first year: 47.14 per cent. of the cases occur between forty and fifty years, 28.57 per cent. between thirty and forty years, 12.85 per cent. between fifty and sixty years, and 11.42 per cent. prior

to the thirtieth year. The majority of the patients are married and fruitful, and do not suffer from menstrual disorders. The disease is attributed to trauma in 12.85 per cent. of all cases, and it is curious to note that the mother of two patients had died of mammary carcinoma, the grandmother of two others had perished from the same disease, while the grandmother of a fifth had died of carcinoma of the uterus. The tumor itself is, as a rule, firm, tense and elastic or hard, fluctuation, contrary to what might be expected, being uncommon. It is not attached to the skin; the subcutaneous veins are not prominent; the nipple is sunken or umbilicated in 5.71 per cent. of all cases; inflammation and ulceration are met with in 4.14 per cent.; and the axillary glands are the seat of irritative enlargement in 10 per cent. of all examples. A sense of uneasiness or pain is experienced in 11.42 per cent., in one-fourth of which it is sharp and lancinating, and there is a discharge from the nipple in 15.71 per cent.

The preceding facts afford little clue to the true nature of the disease as met with during the period of functional activity and the period of functional inactivity of the breast. Hence, simple retention cysts, in accordance with the period of their development, may advantageously be separated into involution and evolution cysts, the former appearing after, and the latter before, the menopause.

*a. Involution Cysts*, or those which occur in the atrophying or obsolescent gland, develop in the acini and smaller ducts, and are due to changes induced by the sclerosed and contracting fibrous tissue, which not only constricts the ducts, but also induces irritative hyperplasia of their epithelium as well as that of the acini. They embrace the majority of the cases recently described by Reclus<sup>1</sup> as "*la maladie kystique des mamelles*," and badly termed intra-acinous cystic epithelioma by Brissaud,<sup>2</sup> who made a minute examination of the specimens.

From notes of 30 examples which I have seen and collated from various sources, I find that the cysts which develop, without assignable cause, except in 10 per cent. from traumatism, after the menopause, occur between the forty-first and sixty-first years, or at an average age of forty-nine, in women who have usually been married and who have borne children. They are, as a rule, seated at the posterior surface and periphery of the lower hemisphere of the breast, vary in size from a pea to a pigeon's egg, and contain a greenish, brownish, greenish-brown, or blackish viscid fluid, although the contents may be clear and transparent, citron-colored, yellowish, or sanguinolent.

In two-thirds of all instances multiple cysts are met with, and both breasts are affected, simultaneously or consecutively, in one-third of all cases. Under these circumstances small cavities are disseminated throughout the gland, hundreds being visible to the naked eye, as in

<sup>1</sup> *Rev. de Chir.*, 1883, p. 761.

<sup>2</sup> *Arch. de Phys. nouv. et path.*, 1884, p. 98.



Fig. 62, from a specimen in the Gross Museum. In other examples,

FIG. 62.



Multiple Involution Cysts of the Breast.

and they are not rare, one or more sacs, varying in dimension from a cherry to a walnut, are seated near the nipple, and smaller cysts are scattered through the gland and at its periphery, the contents being, as a rule, either clear or of a light greenish tint. In a single example, in which the disease was limited to one breast, recorded by Lawson,<sup>1</sup> there were two large sacs which had replaced the entire organ, and rendered it so heavy and bulky as to require support in a sling.

In the remaining third of the cases the cyst is single, varies in size from that of a hen's egg to that of a double fist,<sup>2</sup> and its contents are almost invariably discolored.

The *diagnosis* of multiple cysts is not easy, not a few breasts having been removed under the supposition that the disease was carcinoma. From the extreme distension of the cavities and the fact that they are generally deeply seated in the breast, fluctuation is usually absent, a slight sense of fluctuation being present in the exceptional instances of the larger cysts, which are superficial and found in the vicinity of the areola. In only 2 of the 20 examples of multiple cysts was there a discharge from the nipple, so that the age of the patient, the hard, irregular, and knotted feel of the breast, and, it may be, the presence of an enlarged gland in the axilla, as in the examples witnessed by Paget<sup>3</sup> and Poncet,<sup>4</sup> or of an enlarged gland in each axilla, as in a case of symmetrical disease under my own care, as well as the absence of fluctuation and a discharge from the nipple, are very suggestive of carcinoma. The same statement is true of the exceptional cases of the occurrence of cysts in a gland hardened by previous puerperal mastitis, with retraction of the nipple. The comparative greater frequency of axillary involvement and retraction of the nipple, and the comparative rarity of multiple nodules, as well as of invasion of both breasts, in carcinoma, are, however, valuable aids in the differential diagnosis; but in cases of doubt the breast should not be removed without first resorting to an incision to reveal the true nature of the disease.

<sup>1</sup> *Trans. Path. Soc. London*, vol. xxi. p. 354.

<sup>2</sup> Richelot: *Des Tumeurs kystiques de la Mammelle*, 1878, p. 113.

<sup>3</sup> *Op. cit.*, p. 408.

<sup>4</sup> *Gaz. Hébd.*, 9 April, 1886, p. 244.

When, on the other hand, the cyst is single or double, of considerable volume, and situated superficially, its pyramidal, globular, or ovoid shape, nodulated or slightly lobulated outline, the thinned state and violaceous or dusky-red tint of the skin, the fluctuation, and probably a discharge from the nipple, are signs that cannot be mistaken. Not a few of single cysts, when deeply seated, have, however, been confounded with fibroma and adenoma.

Multiple involution cysts, especially if they affect both breasts, should be let alone, unless they occasion mental and bodily discomfort, when the entire gland must be excised. The management of one or more large cysts does not differ from that of evolution cysts.

*β. Evolution cysts*, or those which form during the period of the functional activity of the breast, are usually due to dilatation of the lacteal sinuses and larger ducts, since only about one-fourth originate in the same way as do the cysts of the senile gland. Of 40 examples that I have analyzed, 6 of which came under my personal observation, the tumor was single in 25 and multiple in 15. The disease was limited to one breast in 26, and both breasts were affected in 14. The walls, as a rule, are thin and vascular, while in rare cases they are calcified.<sup>1</sup> The contents, originally of a lactescent nature, vary greatly in their appearances. In 5 per cent. of all cases they are greasy and oleaginous; in 25 per cent. they are serous; in 25 per cent. they are of a reddish hue or sero-sanguinolent; and in the remainder they are of a green, brown, greenish-brown, black, dark-red, or yellow tint from altered hæmatin, and frequently contain plates of cholesterin. Although, when solitary, they are usually of the size of a walnut, they may constitute globular or ovoid tumors as large as a goose's egg, a fist, or, as in the case of Marini,<sup>2</sup> may contain nine pounds of fluid. When multiple, hundreds may be scattered throughout the gland, their volume varying from that of a hempseed to that of a pigeon's egg. In this event their walls are liable to be thick.

Single cysts are most common in the central area of the breast, and are decidedly frequent near the areola from implication of the lacteal sinuses. They may, however, originate in the accessory glands which lie in the connective tissue immediately beneath the areola, and which Sinéty<sup>3</sup> has demonstrated to exist, to the average number of four, in every fourteen out of fifteen women. A case described by Velpeau,<sup>4</sup> in which a young girl could express a reddish fluid through a small opening two lines below the nipple, doubtless comes under this category. Multiple cysts, on the other hand, usually develop at the posterior surface of the mamma and at its periphery.

<sup>1</sup> Velpeau: *Diseases of the Breast*, Sydenham Soc. ed., p. 272.

<sup>2</sup> *Gazette des Hôpitaux*, 1838, p. 282.

<sup>3</sup> *Bull. de la Soc. Anat.*, t. lii. p. 460.

<sup>4</sup> *Op. cit.*, p. 251.

The disease is most frequent in comparatively young married and prolific women. Thus, of the 40 cases, of 19 the age was from thirty to forty years, of 9 from twenty-one to twenty-eight, of 1 fifteen, and of 11 from forty-one to forty-seven, or of the thirty-fourth year on an average; while 27 were married and, as a rule, parous, and 13 were single. Six examples were directly attributable to injury, but the exciting cause was inappreciable in the remainder.

The outline of evolution cysts is usually smooth, nodulation or bosselation being rare even when the sac is large. Their volume, as a rule, hardly exceeds that of a walnut, that of a filbert or a pigeon's egg being attained in a year, although in one of my cases the size of an orange was reached in that time. Billroth<sup>1</sup> records one as large as a goose's egg in five years; and Richelot<sup>2</sup> one of the bulk of the fist in fifteen years; while in the case of Marini the cyst contained nine pints of a serous fluid in the short space of three months. On the whole, it may be said of these cysts that their volume is moderate and that their increase is slow.

The consistence of evolution cysts is usually firm and elastic, fluctuation being distinct only in exceptional instances. In one example out of every four and four-ninths there is a discharge from the nipple, but it is spontaneous in only one-half of these, and is liable to be bloody when a lacteal duct is partially occluded by a small vegetation. The mamilla itself is deformed in one case out of every ten, being buried through the projection of the sac beyond its level, and preventing suckling. There are no adhesions to the skin or to the chest; the subcutaneous veins were prominent in one example of a large inflamed solitary cyst; there is slight pain in one case out of every seven and one-third; and the partially translucent cyst may have a bluish tint in exceptional instances.

They are not very liable to inflammation or ulceration. In the case of Richelot the sac suppurated and ulceration and gangrene of the skin ensued; in one recorded by Bryant<sup>3</sup> several ounces of pus were evacuated from a suppurating monocyst; while in one instance of multiple cysts, recorded by Sir Astley Cooper,<sup>4</sup> several ulcerated, but subsequently healed. In the cases of Richelot and Cooper there was an enlarged gland in the axilla, a condition which was met with, as the result of irritative hyperplasia, in two other cases,<sup>5</sup> both of which were examples of multiple cysts.

From the preceding facts, deducible from the general history of evolution cysts, it appears that they differ from involution cysts in the

<sup>1</sup> *Chir. Klinik*, Wien, 1869-70, p. 143.

<sup>2</sup> *Op. cit.*, p. 112.

<sup>3</sup> *Guy's Hosp. Reps.*, vol. xliii. p. 452.

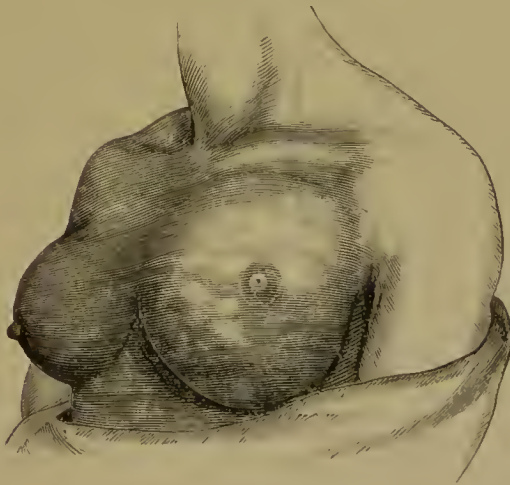
<sup>4</sup> *Loc. cit.*, Case vi. of hydatid tumors.

<sup>5</sup> Demarquay: *Bull. de la Soc. Anat.*, t. xxxvi. p. 326; and Verneuil: *Le Progrès médical*, 6th March, 1886, p. 302.

following particulars: They appear at a far earlier age; develop during the period of functional activity of the breast; are most common as single tumors in one gland; and are more frequently attended with a discharge from the nipple.

The diagnosis of a small cyst is impossible without a resort to the exploring needle, since its firm or hard consistence, mobility, and painless and chronic course render it very liable to be confounded with a small solid neoplasm. A pyramidal or ovoid growth which presents these features, and which is seated near the nipple of a married woman between twenty-one and forty years of age, and which is preceded by or attended with a discharge from the nipple, may reasonably be suspected to be an evolution cyst, while distinct fluctuation and a bluish tint go far to clear up the true nature of the case. When multiple the breast may present a bossed appearance, as in Fig. 63, from Agnew;

FIG. 63.



Multiple Cysts of the Breast.

but the characters of the individual bosses or tubers are merely those of a single cyst.

When solitary and of moderate volume, draining off the fluid by a small trocar and cannula frequently brings about a cure, but, this failing, tapping and the insertion of a drainage tube may effect the object even if the cyst have a capacity of four ounces. When large, the injection of iodine or carbolic acid, incision and packing with iodoform lint, or antiseptic incision and the insertion of a drainage tube, will be required; but the surest plan of treatment is excision of the cyst, which must give way to extirpation of the breast if the sacs be multiple, a sufficiency of integuments being preserved to admit of accurate closure of the wound.

*B. Lacteal Cysts.*—Galactoceles, or cysts containing either pure or



altered milk, are even more rare than simple cysts, and are due almost exclusively to dilatation of the sinuses and larger ducts, the majority being found in the immediate vicinity of the nipple and areola. In accordance with their consistence they are divided into liquid and solid galactoceles, the former predominating. Of 25 cases which I have collated, inclusive of 4 under my own care, the contents were pure milk in 12; of the nature of cream in 4; oil in 1; of a partly curdy material and partly fluid character in 1; of a semisolid, dry, grayish-white curd or caseous matter, which is composed of broken-down epithelial cells, globules of oil, and acicular crystals of palmitine and stearine, or a mixture formerly called margarine, in 6; and of the nature of butter, whence the term butyroid cyst, in 1. These variations in the character of the contents are dependent upon the chemical and mechanical changes which the milk undergoes, the inspissation becoming more marked as that fluid parts with its watery constituent and as the albuminous elements predominate. Calcification of the caseous mass, which has been observed in animals, and which is said by some authors to occur in the female breast, appears to be rather a tradition than a fact founded upon actual observation.

Lacteal cysts are almost invariably solitary, the only exception to the rule of which I have any knowledge being a case recorded by Forget.<sup>1</sup> In this case, in addition to the principal sac, which was of the volume of a double fist, there were two others of the size, respectively, of a pigeon's egg and a hazelnut. These cysts are not liable to inflammation, although in the instance just mentioned the wall of the largest was the seat of two ulcers, the bases of which were formed by the softened and slightly suppurating mammary tissue. Sir Astley Cooper<sup>2</sup> states that ulceration, with escape of its contents, sometimes follows excessive distension of the sac; but the cases which I have examined do not confirm this assertion.

Galactoceles are generally observed during lactation. Thus, of 23 examples in which the date of appearance is noted, 19 occurred at a period which varied from ten days to seven months after parturition, and usually within three months; 1 developed sixteen months before childbirth, and increased most rapidly after weaning;<sup>3</sup> 2 appeared during pregnancy; while in a remarkable instance recorded by Bouchacourt<sup>4</sup> an enormous cyst, filled with pure milk, formed in a woman fifty-one years of age twenty-four years after her last accouchment. In two examples the disease was attributed to a blow, and in at least one there was antecedent mastitis.

<sup>1</sup> *Bull. Gén. de Therapeut.*, t. xxvii. p. 359.

<sup>2</sup> *Diseases of the Breast*, Philada., 1845. p. 19.

<sup>3</sup> W. F. Atlee: *Amer. Journ. Med. Sciences*, April, 1874, p. 419.

<sup>4</sup> Richelot: *op. cit.*, p. 18.

The outline of a milk cyst is globular or ovoid, and not infrequently somewhat nodulated, while its volume and rate of increase depend upon the nature of its contents. Thus, when the contents are fluid it may grow rapidly and acquire the capacity of two, six, and even ten, pints in a short time, as in the celebrated case of Volpi, usually attributed to Scarpa.<sup>1</sup> In this case the breast began to enlarge ten days after parturition, and in less than two months measured thirty-four inches in circumference and rested upon the thigh when the patient was seated. On the other hand, when the accumulation is slow the increase is so gradual that the sac may contain only ten ounces in thirteen years, as in an example recorded by Birkett.<sup>2</sup> When the contents are converted into a cheesy mass, the size and growth vary from the dimensions of a pigeon's egg in seven months to those of a child's fist in three years.

During its entire course a galactocoele is unattended with pain or tenderness; the skin is not discolored; the nipple is natural, except in rare cases in which the swelling protrudes beyond its level and interferes with suckling; the axillary glands are not enlarged; there are no adhesions; and the general health does not suffer.

A large, solitary, pendulous, painless, soft, and fluctuating tumor, with prominence of the subcutaneous veins, which formed suddenly during lactation, may safely be pronounced to be a cyst containing milk; and the diagnosis is confirmed if, as occasionally happens, a few drops of that fluid can be made to escape from the nipple. When of moderate volume, a liquid galactocoele will usually be found to increase in size at each successive parturition, to become tense during suckling, and to decrease, or even disappear, with the cessation of lactation. Despite these changes in volume, it, however, continues to grow slowly, and is the seat of fluctuation.

When, on the other hand, the contents are of a semisolid or cheesy nature, the distinction between a lacteal cyst and a small fibroma is scarcely apparent. Thus, in a lady twenty-four years of age, whom I recently saw, there was a round, slightly nodulated, firm, and painless tumor just internal to and above the areola, which rolled under the finger, was of the volume of a hickory-nut, and was of sixteen months' duration. As it developed two weeks after parturition, I inclined to the opinion that it was a solid galactocoele, but I was not certain as to its true nature until an exploratory incision gave vent to its curdy contents. In such cases the swelling is observed, soon after its commencement, to fluctuate; but it gradually becomes solid, and frequently diminishes in size, and may even retain the impression of the finger.

Upon the whole, in the absence of exploratory puncture, the development of a tense, fluctuating swelling, without signs of inflammation,

<sup>1</sup> Boyer: *Maladies Chirurgicales*, 1st ed., t. vii. p. 287; and Forget: *loc. cit.*, p. 356.

<sup>2</sup> Holmes' *System of Surgery*, 3d ed., vol. v. p. 448.

during pregnancy or lactation, affords presumptive evidence of a milk cyst.

The treatment of lacteal cysts should be based upon the size of the tumor. When of moderate dimensions the contents may be evacuated and the sac injected with a few drops of carbolic acid; or the cyst may be laid open and wiped with tincture of iodine or a strong solution of chloride of zinc; or it may be excised—a method of treatment which is more severe than the others, but one which will be followed by a more rapid recovery. When quite small it is even possible to bring about absorption without resorting to surgical measures. Thus, in one of my patients who declined active interference the application of ammoniac plaster with mercury for two months caused the disappearance of a cyst, the true nature of which had been determined by the exploring needle, of the volume of a large cherry, which was seated above and internal to the nipple.

When the tumor is bulky the procedure usually recommended is to evacuate the contents and insert a drainage tube, the child at the same time being weaned, and the secretion of milk arrested by appropriate external and internal medication. The objection to this method of treatment is that a fistulous passage is established, which refuses to heal, so that many months may elapse before the object is accomplished. Hence, voluminous tumors, especially when the wall of the sac is much thickened, are best managed by antiseptic incision and drainage, the operation differing in no wise from that practised by Volkmann for the relief of hydrocele of the vaginal tunic, except that bichloride of mercury should replace carbolic acid as the germicide.

## 2. CONNECTIVE TISSUE OR LYMPHATIC CYSTS.

Connective tissue, endothelial, lymphatic, or serous cysts are due to the collection of fluid in the interfibrillar lymph spaces of the connective tissue stroma of the breast, which subsequently enlarge and coalesce, and constitute a cavity lined by a fibrous wall invested with endothelium or a layer of flattened connective tissue cells. In the present state of our knowledge a full and accurate account of lymphatic cysts cannot be written, not because they are uncommon, but for the reason that the records are imperfect as regards the histology of the cyst wall. They doubtless, however, include the "thin membranous cyst, containing a transparent watery fluid, without coagulable matter," of Sir Benjamin Brodie,<sup>1</sup> as well as the serous cysts of Birkett,<sup>2</sup> the contents of which are not coagulable by heat or nitric acid, the wall of which is lined with "squamous epithelium," and which is "always perfectly closed, and never communicates with a duct."

<sup>1</sup> *Works of Sir Benjamin Brodie*, vol. iii. p. 229.

<sup>2</sup> *A System of Surgery*, edited by Holmes and Hulke, 3d ed., vol. iii. p. 448.

The first true description of the connective tissue cyst, based upon minute examination of its wall, was published by Gadsby,<sup>1</sup> in 1878, in the case of a breast removed by Marshall. The hardness of the small tumor, which was seated at the outer side of the right nipple, its faint lobulation and deep attachment, along with the slight induration of the axillary lymphatic glands, and the age of the patient, gave rise to the suspicion of a slowly growing scirrhus. Many cysts were disseminated throughout the breast, and the main one was filled with a brownish mucoid fluid, and its wall, stained with nitrate of silver, showed the characteristic endothelial lining. Hence, Gadsby termed it a lymphatic cyst.

The only paper containing anything like a satisfactory account of the disease, founded upon the structure of the wall of the cyst, is that of Butlin, which appeared in April, 1884; but the cases which he had seen and collected are so few that the general history of the affection remains to be written. In the three cases detailed by Butlin, as well as in that of Gadsby, the breast was supposed to be carcinomatous; and in a few months after reading Butlin's paper I actually amputated the breast under the firm conviction that the disease was carcinomatous. The case was that of a 3-para, forty-eight years of age, who still menstruated, and who accidentally discovered, two months previously and six weeks after striking the breast against a door, a densely hard nodule, of the volume of a filbert, in the upper and outer quadrant of the right gland. Her mother had died of mammary carcinoma, and the nipples were intractable, so that she had never suckled her children. The amputated gland contained five cysts, of which the largest represented the tumor felt before the operation, filled with a dark greenish fluid, and the walls of which had an endothelial lining.

The contents of lymphatic cysts are of a clear, straw-colored, turbid, greenish, or brownish hue; but as the fluid was lost in the cases examined by Gadsby, Butlin, and myself, it is impossible to confirm the statement of Birkett that it is nonalbuminous. Should the statement, however, be verified by more extended and careful investigations, the nature of the fluid will prove invaluable in the differential diagnosis of the various mammary cysts. As I have seen only one case of the affection, I am obliged to make the following quotations from Butlin, which illustrate its life-history:

"The patients in the cases which I have seen and collected were, without exception, over forty years of age, and the oldest of them was sixty-six. Some of them were married, some were single, but in no instance was the disease attributed to pregnancy or to the bearing or suckling of children.

"The cysts, whether single or multiple, seldom attained a large size;

<sup>1</sup> *The Lancet*, vol. i. 1878, p. 234.



most of them are described as about the size of a pigeon's egg, and the largest was not larger than a small orange. Yet the duration of the disease was two years in one case and five years in another. It is, however, right to say that most of the tumors were operated on when they had been noticed a few weeks, or at most six months, generally because they were believed to be cancerous. Although the fluid is usually tightly enclosed in the capsule, they are not generally very painful; indeed, absolute freedom from pain was noted in the majority of instances.

"It need scarcely be stated that the diagnosis of connective tissue cysts from carcinoma is often exceedingly difficult; the cases which have been related are sufficient proof of this. When the cyst is single, of large size, situated in a small breast, and not too deeply placed, it is usually easy to detect fluctuation; but when the cysts are multiple and small, and surrounded by, or imbedded in, indurated tissue, or when there is a single cyst, very tense, deeply situated in the substance of a large flat breast, it is, I believe, impossible to be certain of the nature of the disease. The suspicion that it is not carcinoma must rest on the absence of several of the lesser signs of carcinoma, such signs as retraction of the nipple, adherence of the skin, and enlargement of the glands."

From the foregoing description it is evident that connective tissue cysts, like involution retention cysts, occur during the functional inactivity of the breast. In both varieties the cysts are frequently multiple, hard, and do not fluctuate, and are commonly confounded with carcinoma. Lymphatic cysts do not appear, however, to attack both breasts, and they are never attended with a discharge from the nipple. These points, along with the nonalbuminous nature of their contents, may prove serviceable in their diagnosis from evolution cysts.

In the treatment of connective cysts mild measures frequently bring about a cure. When the cyst is single, simple puncture, with the application of an embrocation consisting of chloride of ammonium, alcohol, and camphor mixture, succeeded in affording permanent relief in eighteen cases in the hands of Birkett.<sup>1</sup> Should the cysts be multiple and not excite apprehension, they may be let alone. Under opposite circumstances, if the breast be filled with cysts, it should be excised, but should a few cysts lie close together, they may be opened and drained through a single incision.

### 3. HYDATID CYSTS.

When the embryo of the *tænia echinococcus* finds its way into the stroma of the mamma, it is transformed into a vesicular worm, and is soon encapsuled by a fibrous membrane of new formation, in which it

<sup>1</sup> *A System of Surgery*, edited by Holmes, 2d ed., vol. v. p. 266.

grows and multiplies until it occasions a tumor which may attain the volume of a fist. It is the most uncommon of all the cysts of the breast, as is shown by the fact that, up to 1874, Haussmann<sup>1</sup> of Berlin had been able to collect only sixteen examples, to which may be added seven cases recorded, respectively, by Lauenstein,<sup>2</sup> Landau,<sup>3</sup> Guermouprez,<sup>4</sup> Fischer,<sup>5</sup> Höppener,<sup>6</sup> Rizzoli,<sup>7</sup> and Medini.<sup>8</sup> In the case of Landau the sac communicated, by an opening three centimeters square through the ribs and intercostal muscles, either with the cavity of the chest or the abdomen, but it was impossible to determine whether it was connected with the pleura, the diaphragm, or the liver. In none of the remaining twenty-two cases did the parasites reach their destination by ulceration through the wall of the chest, but they entered it through the usual channel of the circulation.

In the majority of instances there is a single cyst with scolices adhering to its inner wall or germinal membrane or floating in its clear, non-albuminous, saline fluid; while in the others there is a parent cyst containing from one to four, but rarely more, smaller vesicles, the size of the former varying between that of an apple and that of a man's fist. The limiting capsule is composed of vascular connective tissue, and may reach the thickness of two-fifths of an inch.

Hydatid cysts occur as early as the seventeenth and as late as the fifty-sixth year. Of 16 cases in which the age is noted, 1 first appeared at seventeen; 10 between twenty and thirty years; 2 between thirty and forty years; 2 between forty and fifty years; and 1 after the age of fifty. Their growth is extremely slow, although it is very variable. Thus, they may attain the size of a filbert in eleven months, of a small egg in two years, of an orange or a cocoanut in five years, of a pigeon's egg or a fist in six years, or of an apple in three or eight years; so that, while an average rate of increase cannot be assigned to them, the endogenous hydatid may be said to be of slower growth, although it finally acquires a larger volume, than the single cyst. Their increase is materially hastened by trauma, and in one instance appeared to advance during lactation.

From the twenty-two cases which are available for writing the life-history of these tumors, it appears that they grow slowly, attain moderate size, are painless, of a round and smooth outline, of a firm or firm and elastic consistence, mobile under the skin, not attached to the

<sup>1</sup> *Die Parasiten der Brustdrüse*, Berlin, 1874.

<sup>2</sup> *Ueber der Vorkommen von Echinococcus in der Mamma*, Inaug. Dissert., Göttingen, 1874.

<sup>3</sup> *Archiv für Gynäkologie*, Bd. viii., 1875, p. 350.

<sup>4</sup> *Archives de Tocologie*, 1884, p. 14.

<sup>5</sup> *Deutsche Zeitschrift für Chirurgie*, Bd. xiv. p. 366.

<sup>6</sup> *St. Petersburg med. Wochenschrift*, No. 51, 1881, p. 449.

<sup>7</sup> *Bull. delle Sc. Med. Bologna*, vol. xii., 1883, p. 168.

<sup>8</sup> *Ibid.*

chest, seated at the upper and outer part of the breast and never in the immediate vicinity of the nipple, free from changes in the skin, veins, and lymphatic glands, little liable to inflammation, and do not impair the general health.

Deviations from this general course were indicated by pain in 5 instances; by slight tenderness on manipulation in 5; by a nodulated outline in 4; by fluctuation in 7; by attachment to the skin in 5; by irritative hyperplasia of the axillary glands in 2; and by inflammation, with ulceration and the escape of purulent fluid, which had accumulated between the parasite and the enclosing cyst as a result of irritation, in 5.

While the prognosis is highly favorable, the diagnosis is most obscure, the discrimination between it and a simple cyst being impossible, but being easy when compared with a lacteal cyst which appears during lactation and is usually prominent in the vicinity of the nipple. In two cases it was thought to be carcinoma; and it is also liable to be confounded with other neoplasms, unless exploratory puncture be resorted to.

The treatment should be limited to incision with drainage, or incision and dressing from the bottom, the operation selected depending upon the size of the cyst.

# DISEASES OF THE BREAST OTHER THAN TUMORS.<sup>1</sup>

By ROSWELL PARK, A. M., M. D.,

BUFFALO.

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IT seems unnecessary to go into the ordinary details of the anatomy of the mammary glands. Their site, average size, etc. are too commonly noted to call for description here. But certain facts less familiar deserve mention. Ordinarily, they reach from the third to the seventh rib vertically, and externally to the axillary borders. The apparent size of the breasts is in large degree a matter of adipose tissue, since even in the bosom of large volume there may be little if any more glandular tissue than in one of half its apparent size. They are not, furthermore, always of the same size.

We speak commonly of the four quadrants of the breast, though Hennig has shown that the natural division is rather into thirds, one inner and two outer. The nipple is not usually placed in the exact centre of the rudely circular mammary base, but will be found a little above and inside of that point. According to Luschka, in 44 of 60 individuals examined the nipple lay over the fourth intercostal space, six times over the third rib, eight times over the fourth rib, and twice over the fifth intercostal space. Sixteen times out of fifty the right nipple was found farther from the middle line than the left.

The base of the mammary gland is somewhat oval, having its longest diameter directed upward and outward toward the axilla. It lies imbedded in connective tissue continuous with the superficial fascia, by which it is in a measure swung from the clavicle, and rests upon the great pectoral muscle, separated from it by a layer of firm areolar tissue continuous with the deep fascia. Prolongations of the lobules sometimes pass into the surrounding tissue beyond the apparent limits of the breast. By a circular sweep of the knife, and the removal of the breast therewith, a little of this gland-tissue might thus be left.

The *mammæ* are compound racemose glands, and, like all other glands of the skin, arise from a bud-like invagination of the rete

<sup>1</sup> For puerperal disease of the breast, see *System of Obstetrics*, Vol. I.



Malpighii of the skin, appearing at about the third or fourth month of intra-uterine life. Soon this bud sends out as many pear-shaped processes as there will be lactiferous ducts (Fig. 64). These remain almost unchanged until about the age of puberty in the female, and almost never develop any further in the male. They have fibrous walls derived from the connective tissue of the skin, and are lined with epithelium. At their blind extremities are aggregations of these epithelial cells, and it is not uncommon to find, soon after birth, the whole process greatly distended with these cells in every stage of degeneration, often

FIG. 64.



FIG. 65.



giving rise to a mastitis which may, according to Kölliker, destroy the process and lead to a poorly-developed or small breast. At the age of puberty in the female the processes rapidly (Fig. 65) lengthen and break up into numerous sac-like ramifications, each of which again leads to the formation of a cluster or lobule of acini. These are bound together by white fibrous connective tissue, with occasional elastic fibres. The acini or alveoli are the proper secreting portion of the gland, and are lined with small polyhedral cells lying on a *membrana propria*. The ducts leading from them to the nipple also have a *membrana propria*, but are lined with cylindrical epithelium. In the maiden breast the connective tissue surrounding the lactiferous ducts is peculiar, and unlike that enveloping the lobules in that it is coarser and tougher than the latter, is more cellular, and has a hyaline appearance, giving the organ that elastic, tense consistency peculiar to the virgin. The nipple, though quite marked and well developed at birth, undergoes very little change until after the age of puberty is reached, when it also increases in size with the rest of the gland. It is pierced by from twelve to fifteen lactiferous ducts, whose orifices are scarcely large enough to allow the passage of a bristle. Besides these and connective tissue the nipple contains numerous bundles of smooth muscle-fibre (Fig. 66) which surround the ducts and run in various

directions. They have been traced along the ducts, and some investigators have even found stray fibres in the tissues around the lobules. The arteries of the mammary glands are derived from the *mammaria interna* and *thoracica longa*. They anastomose very freely, and form a capillary network round the lobules; from these numerous veins arise

FIG. 66.



which follow the arteries and form a very dense plexus of veins under the skin, and finally end in the *vena mammaria interna* and *thoracica longa*. Some of the subcutaneous veins, however, empty into the *vena jugularis externa* (Luschka). The lymphatics are very numerous, and surround the lobules with the blood-vessels, forming a network. They do not communicate with the connective-tissue spaces, but follow the ducts out of the gland. In the skin they begin with sac-like dilations and form cutaneous and subcutaneous plexuses. Ultimately, they empty into the glands of the axilla and thorax (Luschka). The nerves of the mammary glands are largely spinal, and are derived from the fourth to the sixth intercostals. They follow the ducts into the gland, and are lost in the walls of the acini. Their connections with the cervical and brachial nerves must not be forgotten, for thereby is explained the radiating pains of which many patients with breast troubles complain so bitterly.

It is during the first pregnancy that the mammary gland reaches its highest development. Now the acini will be found to increase rapidly in size and number (Fig. 67); the connective tissue becomes succulent, more vascular, and more cellular, so that, while it is almost impossible in the virgin breast to separate the lobules from the investing connective tissue, and the whole gland appears to the naked eye like a mass of tough connective tissue, they can now be distinctly seen and easily separated. The lactiferous ducts become

dilated and sacculated from the pressure of accumulated secretion, forming the so-called *sini lactei*, and the nipple increases in size.

FIG. 67.



FIG. 68.



When lactation ceases the acini collapse, but do not disappear, holding themselves in readiness, as it were, for the next pregnancy. The connective tissue does not return to its former characteristic condition, but remains soft and flabby, and shows a marked tendency to become fatty. After the menopause is reached, when the whole gland atrophies, the acini with their epithelium disappear and are replaced by fat; only the ducts remain, and even their epithelium degenerates and dies (Fig. 68).

All these internal changes need not necessarily change the external appearance very much, since fat is substituted for the gland-tissue proper if the general nutrition of the individual be good.

#### CONGENITAL DEFECTS AND EXCESSES; VICES OF CONFORMATION.

*Absence of Mammaræ; Amazia; Micromazia.*—Total absence of one or both breasts is a very rare congenital defect. Maraudel<sup>1</sup> speaks of one case; Lousier,<sup>2</sup> whose daughter had the same defect, also of

<sup>1</sup> *Dict. d. Sci. Med.*, xxx. 378.

<sup>2</sup> *Diss. sur la Lactation.*

one; and Froriep<sup>1</sup> of one. In each of these one breast was fairly developed, the other one totally wanting. In Froriep's case there was also deficiency of the underlying ribs and the pectoralis major was absent.

When the ovaries are found to be rudimentary the breasts are usually very ill developed; this constitutes *micromazia*. Such cases have been observed by Cooper, Caillot, Laycock, and Ebstein. In many other cases the breasts are found to be more or less rudimentary, so that they are incapable of performing their proper lacteal function.

*Supernumerary Mammæ; Polymastia; Pleiomazia; Polymazia.—Supernumerary Nipples; Polythelia.*—Excesses of formation are more common than total defects, and have been observed in both sexes. They may be easily explained as one of the features of that earlier and lower condition in which the number of breasts seems to correspond to the number of progeny in a litter. Thus looked upon as a temporary reversion to an earlier type or a manifestation of *atavism*, they are no more to be wondered at than hare-lip or imperforate rectum. The Diana of the Ephesians and the Egyptian Isis (so ancient history relates) were represented in their statues as having the thorax and abdomen well covered with supernumerary mammæ, and were thereby supposed to typify *Nature*, the mystic mother of all things that have life. History also relates that a third breast on the person of the unhappy Anne Boleyn so enraged the unsympathetic Henry VIII. that by nothing short of her death could his anger be assuaged.

Supernumerary mammæ are usually pectoral, less often abdominal, and are still more rarely met with on the thigh, shoulder, or back. A single additional breast is commonly met with below one of the others; if a pair exist, one may be found in each axilla; when a third extra one is added, it is found in the neighborhood of the umbilicus. They rarely if ever actively functionate.

Many supernumerary nipples are mistaken for moles or nævi or spots of molluscum. Lichtenstein believes that some variation of this kind is to be met with once in about five hundred persons. Bruce thinks that many are never reported, and that they are relatively quite frequent. The real nature of such a mark may only be revealed by accident or by pregnancy. They oftentimes lack areola, or papillæ, or hair-follicles.

According to Meckel, the earliest types of our species were provided with five mammæ—two pectoral, two axillary, and one near the navel in the middle line. Five seem to have been the largest number noted in any recorded case save one, Gorré having seen one woman with five

<sup>1</sup> *Notizen*, 1839.



breasts thus distributed, while Santerson has reported the case of a male with five nipples in corresponding positions. Alexander has recorded the case of a male mulatto with *six* nipples in whose family there were many such defects. When we recall the widely varying positions in which the mammae are found in various vertebrates, we shall be less surprised to find one reported on the shoulder of one individual, the groin or thigh of another, or even on the back, since Lichtenstein quotes two of these latter—one reported by Paulinus, the other by Helbig. Handyside has spoken of three brothers each of whom had four breasts.

Sometimes a supernumerary breast will have no nipple, but its secretion will ooze through the skin; sometimes a breast, either in its proper place or elsewhere, will be supplied with two nipples. Fitzgibbon<sup>1</sup> has recorded the case of an individual with double symmetrical nipples on each side, the extra pair being below the others and toward the middle line. Once in a while the extra nipple seems to be connected with the main one by a ridge of gland-tissue. As when one breast or one nipple is wanting it is usually the right, so when there is excess of development, and one is added, it occurs almost always on the left side. When one breast is larger than the other, which is not infrequently the case, it is almost always the left. Klebs would explain this by an intra-amniotic rotation of the anterior segment of the fœtus to the left, and points out that congenital defects of the lungs or thoracic walls are more common on the right side than the left.

A considerable number of cases of polymastia have been reported. Puech has collected 77 French cases; in 46 there were three breasts, in 29 four, and in 3 five. Lichtenstein<sup>2</sup> has noted also 105 German cases. There are, as nearly as I have been able to learn, some 15 cases reported in American literature. Together, these make nearly two hundred cases, from which limited number one would naturally infer that the condition is one of great rarity; instead of which we are assured by those who have most carefully studied the subject that variations from the normal number and location of the mammae are not infrequent, and that the reason so few appear on record is that such anomalies are made known, as a rule, only by accident, and but few of those made known are reported.<sup>3</sup>

*Hypertrophy of the nipple alone* is an exceedingly rare condition. Murat has put on record the case of a nurse who could not suckle the infant for whom she was engaged, on account of this peculiarity. It

<sup>1</sup> *Dublin Quart. Journ. Med. Sci.*, 1860, xxix. 109.

<sup>2</sup> *Virehow's Archiv*, lxxiii. 2, p. 222.

<sup>3</sup> *Vide* Klebs: *Handbuch d. pathol. Anat.*, p. 1161; and Duval: *Du Maçelon et de son Auréole*, p. 82 et seq., Paris, 1861.

may be too large in diameter or too long. If too large for a puny infant, it may yet answer for an older or larger child.

On the other hand, the nipple may be preternaturally short or small or retracted, without coexistence of active disease. These conditions are more common, and sometimes prevent the child's nursing without artificial aid. The constant suction of a nursing child is calculated to overcome this condition to a certain extent.

*Congenital imperforation* of the nipple is only a pathological curiosity, and perhaps has never been seen. Its closure by inflammatory processes does not concern us in our present article, since it affects only the nursing child, or the consideration of cysts from obstruction of outlets.

### IRREGULAR OR ABNORMAL SECRETION OF MILK.

The regular function of the breasts appears to be at times awakened in irregular and bizarre ways. There are on record cases where women who have never been pregnant have yet been able to nurse children from their own mammæ. Again, women who have not borne children for many years have, with or without some stimulus, found their breasts refilling with milk. Thus we have record of a woman of *sixty-one* who suckled her grandchild *eighteen* years after the birth of her own youngest child; and Heister has told how a woman was accused of having murdered her own infant because there was milk in her breasts twelve months after having weaned her first offspring. Carganico in 1838 related a case of a woman fifty-nine years old who nursed a grandchild nine months old, though she herself had borne no child for seventeen years, and had passed the menopause ten years (Beigel).

In Baudelocque's *Art d'Accouchement* is mentioned the case of a girl of eight whose breasts secreted milk in consequence of having applied to them an infant. Even from the breasts of newborn children a milk-like fluid has been expressed; and Will relates that an infant of thirty weeks lost milk from its breasts for some time.<sup>1</sup> Kölliker has shown that this is not inconsistent with the anatomical arrangement at birth.

It furthermore occasionally happens that the breasts begin again to functionate in certain cases of uterine and ovarian tumor.

### HYPERTROPHY.

That simple hypertrophy or hyperplasia of the breast may be mistaken for tumor-formation is quite possible; yet that such outgrowth may exist and not have the significance of a neoplasm is undeniable. It is certainly, however, a rare affection. According to Cooper, it is a

<sup>1</sup> Beigel: *Die Krankheiten d. weibl. Geschlechtes*, 1875.

disease of middle or advanced life, while Gross held that it generally began at an early period. The latter had opportunity to observe a well-marked case in the person of a colored girl of seventeen, one of whose breasts weighed as much as fifteen pounds. Still more remarkable cases than this have been observed: in a solitary instance it is said that the breasts reached the knees, drawn out of all semblance of *mammæ* by their weight and tension. Cases have even been recorded where the weight of the breasts in the erect position was intolerable, and where by pressure they interfered with respiration when in the recumbent posture. Huston mentions a breast which was *one meter* in circumference and weighed 8500 grammes. Durston speaks of a case in which one breast weighed sixty-four pounds. One alluded to by Jourdan had a large deep furrow in which the arm rested. Beuvin and Monteils have recently published the case of a girl of sixteen whose *mammæ* were conspicuously hypertrophied; after marriage and several pregnancies the enlargement had notably diminished. Probably with each lacteal engorgement there was enough vascular excitement to cause absorption of connective-tissue elements, or it occurred with the involution of the gland.

Labarraque<sup>1</sup> collected 26 cases, of which only 5 were over twenty-six years of age. The integument of young women has more contractility and strength to resist distortion than has that of the old. When such enlargement occurs in girls at or near puberty, there is usually more or less disturbance of the menstrual function, sometimes even suppression. In this case the voice is commonly changed, becoming harsher and more masculine.

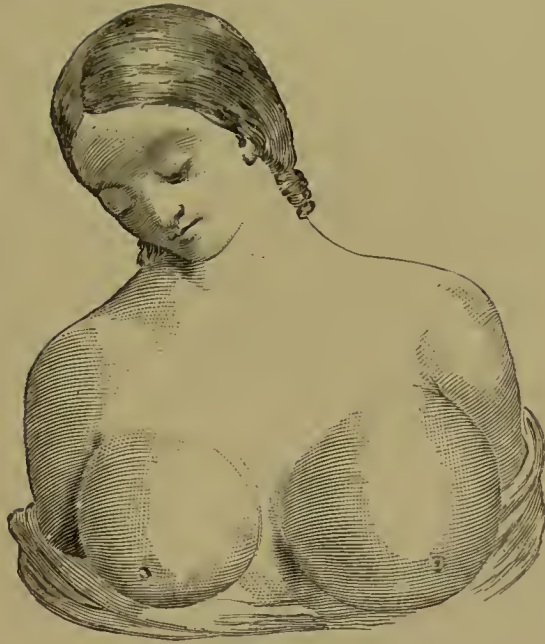
The overgrowth may involve one breast or both; when both are implicated it is seldom to the same extent. Frequently as their size increases the general health of the individual begins to suffer, and the most marked instances have been noted in very emaciated patients.

The anatomical arrangement of the constituents of the simple hypertrophied breast in no wise differs from that of the natural bosom, either in nature or in arrangement. No reference is here made to adenoma nor retro-mammary lipoma, nor the *corps fibreux* of Cruveilhier; only to that condition of multiplication of all the histological elements of the breast *en masse* in nearly their normal proportion. Any conspicuous alteration of the latter would place the growth in the category of tumors proper. It has been known to some as *elephantiasis*, and indeed Virchow has described two varieties which he has termed soft and hard elephantiasis. He has also spoken of a febrile form, in which the enlargement takes place rapidly and is accompanied by general febrile disturbance with local signs of hyperæmia. (*Vide* Acute Engorgement.)

As a rule, the condition is painless, at least up to the time when the

<sup>1</sup> "Hypertrophie générale de la gland mammaire," *Thèse de Paris*, 1875.

FIG. 69.



Hypertrophy of Breast (Birkett).

weight of the parts causes unbearable tension ; nevertheless, once in a while a neuralgic or irritable condition is noted. It has been attributed by different authors to deranged menstruation, excessive venery, blows, etc., the variety of ascribed causes attesting the uncertainty attending our knowledge of its etiology.



DIAGNOSIS is not difficult, the only conditions resembling it being lipoma and cysto-sarcoma.

TREATMENT.—In the way of treatment, calomel, tartar emetic, emmenagogues, and purgatives have been commended by one or another. A fair trial may be given to these or to any drugs which may appear to be indicated, but they are not likely to do much more than to act as placebos. When the breasts become a nuisance, as they do sometimes, the only relief is excision—an operation which the advances of the day have robbed of its terrors. It is seldom a dangerous operation in any case which justifies it, and in such cases, where there is no necessity for further dissection for removal of affected tissues, may be advised with a feeling of perfect confidence.

#### ATROPHY.

When all possibility of further functioning has passed away the breasts undergo an atrophy from disuse akin to senile changes elsewhere. This subsidence commences usually with the menopause, and the organ frequently so completely withers away that only the atrophied nipple marks its former location, especially in those women in whom it has always been small. In married women who are sterile the gland may shrink to quite small proportions, as it may, too, in those who have offspring which they have not nursed.

Certain drugs are said to induce atrophy, such as conium and iodine. It is sometimes noted that the neuralgic or irritable breast undergoes an early atrophy—an anticipated senility, as it were.

If atrophy in young women can be traced to a recognizable cause, it may be possible by removal of the latter to check the former. Massage of the mammary region may stay its course, just as much handling of the breasts in girls leads to their earlier development. Otherwise the condition must be recognized as permanent.

#### DISEASES OF THE NIPPLE AND AREOLA.

Of the various skin diseases, eczema is by all means the most common. It is easily recognized, is usually as amenable to treatment as eczema of other localities, and calls for about the same applications. In mild cases the dusting on of a little bismuth subnitrate or protection by a plaster spread with one of the oleates is to be recommended. In severe cases a rigorous search must be instituted for any source of constitutional irritation; the urine should be carefully examined for evidences of a gouty vice; the condition of the *primæ viæ* fully ascertained, etc. The majority of cases will be found to depend on insufficient elimination of urica, associated with a more or less deranged

digestion. For such cases appropriate internal remedies, with exact regulation of the diet, must be associated with local astringents or sedatives.

Next most common of the skin affections probably is psoriasis. This, too, is easily diagnosed, being likely to be mistaken only for a syphilide. The diagnosis will be largely aided by the presence or absence of concomitant signs of lues; still further so if one remember that when the scales are scratched off from the syphilitic lesion there is a little bleeding; when from the non-specific, there is none.

It would seem that other superficial lesions of the parts are so seldom dissociated from similar trouble elsewhere that their consideration can be dispensed with here. Further discussion of specific disease is also postponed.

Ulcers and fissures—which latter are only linear ulcers—are the result in the vast majority of cases either of syphilis or lactation. Vidal has compared them to the excoriations occurring in cases of balanitis. But ulcers may occur as the result of uncleanness, abrasion, caustic drugs, or an innocent skin disease—*e. g.* pemphigus. If already healthy, they need only the simplest treatment; if irritable, they must be cauterized or in some way converted into healthy sores. Local anæsthesia by cocaine will easily permit such conversion.

Abscess limited to the region of the areola is once in a while met with. It probably arises as a folliculitis of one or more of the small sebaceous follicles found thickly dispersed here. Inflammation once begun in so limited a region can commonly be easily checked by the application of either prolonged heat or cold; if not, a small collection of pus may result. This will be superficial, and should be opened so soon as recognizable: the incision should be in the line of a radius directed from the nipple as a centre; a few strands of catgut or a tent of some kind will prevent the too speedy closure of the little wound.

Excoriations, fissures, and abscesses, such as those mentioned above, are the commonest causes of erysipelas and lymphangitis.

*Hyperæsthesia.*—The nipple is naturally one of the most sensitive spots of the entire integument, but its normal sensibility may be rendered painfully acute as an accompaniment of some inflammatory affection or as a sign of a neurotic or erotic disposition. Sometimes when such a nipple is rudely touched there occurs a spasm of all the contractile elements in the breast, which is momentary, but quite painful (*thétotisme* of the French writers).

## INJURIES; HEMORRHAGES.

*Contusions* of the breast are common. About the milder forms we need say nothing. Of the more severe forms we will simply refer to

the liability to formation of extensive ecchymoses or even traumatic hæmatoma. Ecchymoses vanish in due time—more rapidly when a lotion of ammonium chloride is applied—and most hæmatomata will undergo absorption. But local inflammation may run high, a general mastitis supervene or abscess form. The possibility of a submammary hæmatoma must be borne in mind. Such would carry the whole mamma forward and cause it to appear to be set on a species of base.

The consequences of contusion are usually of short duration; still, they are in bad repute, since they are so often the alleged precursors of malignant disease. The most effective prophylaxis will be, obviously, enforcement of proper rest and continuance of proper local treatment. If a collection of blood be not in due time absorbed, it would be good practice to incise, and thus get rid of it, since blood-clots here, as in the brain or elsewhere, often undergo cystic degeneration.

*Burns* of the breast, either from steam, hot water, or fire, in no respect differ from those of other parts, and are to be subjected to similar treatment. Recent experience has shown that a *saturated* solution of sodium bicarbonate makes as soothing an application to a raw burn as anything that has been devised.

Incised, punctured, and gunshot wounds in this region have but few peculiarities. By a large incised wound a number of milk-duets may be divided, and a part of the breast be thereby so interfered with as to undergo subsequent atrophy. The elasticity and contractility of the parts will make a small wound gape widely. Again the ribs, or even the lungs or the intercostal vessels, may have been wounded through the breast. If attention to the deeper parts were urgently needed, one need not hesitate either to enlarge the wound or to include the breast in a large skin-flap, and by dissection of the retro-mammary areolar tissue to lift it up off the ribs, restoring it, and suturing it down after meeting the other indications.

*Gunshot wounds* which involve the breast alone entail little danger if properly treated. To be sure, the nipple has been so far destroyed by accident as to sadly impair or remove all further usefulness of the gland. Such an accident might in rare cases justify extirpation of the entire gland.

In the treatment of all these traumatisms the writer not only advises that they be subjected to scrupulous antiseptic measures, but he must assume that the reader is thoroughly qualified to carry them out. This granted, the treatment comprises complete hæmostasis, removal of all irritating matter or foreign bodies, neat coaptation of wound surfaces, proper provision for drainage, abstention from all probing or other interference in gunshot wounds unless imperative, and suitable occlusion or dressing.

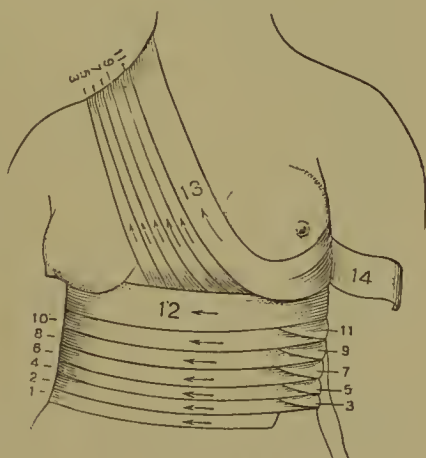
For the rapid union of wounds it is essential that proper dressings

should be properly applied. The accompanying engravings (Figs. 70-72) taken from Leonard's *Manual of Bandaging*, show some of the best methods.

By vicious cicatrices the nipple, or even the mammae, may be so distorted or interfered with as to make future physiological function insufficient or impossible. If escape of milk from the nipple were impossible, it would be much better to remove the gland than to permit cystic dilatation of the ducts. But such cases must be extremely rare. From such cicatrices also keloid might arise. Keloid limited to the breast itself might be disposed of by removal of the part, but ultimate cure must always be doubtful in such cases.

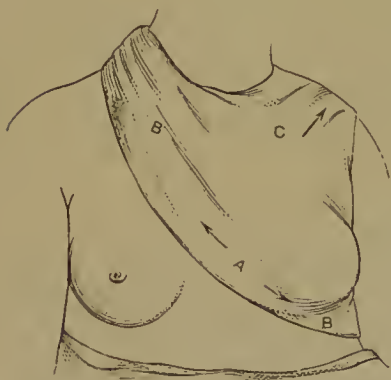
*Foreign bodies* may also be met with in the breast. Thus, Vidal has related a case in which he was led into an error of diagnosis, his mis-

FIG. 70.



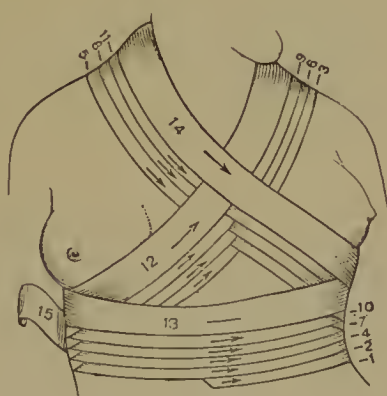
Cross of One Mamma.

FIG. 71.



Triangular Bandage applied to the Bosom.

FIG. 72.



Cross of Both Mammæ.

take being rectified when he withdrew from a supposed tumor an ordinary sewing-needle, of the possibility of whose presence the patient claimed to be utterly unaware.

*Calcareous concretions* are also very rarely found in the breast: Gross has met with them twice. These correspond with the so-called milk-stones much oftener met with in the udders of animals, and are probably the result of a calcareous degeneration—a species of petrification—of previously existing products of inflammation and obstructions.



Gross states also that he once met with a cyst in the breast whose walls were calcified. (*Vide* also Chronic Mastitis.)

*Spontaneous hemorrhages*, sometimes called *apoplexies*, occur in rare cases without suspicion of injury. Naturally, most of these are expressions of a vicarious menstruation, and they may be normal or abnormal for the particular individual. They are most common at the time of puberty, and rarely continue long. Now and then they are met with in adult life, mostly in women suffering from amenorrhœa or dysmenorrhœa. They are usually preceded by a sensation of weight, fulness, and heat, which subsides as bleeding continues.

When purely a vicarious menstruation, it should be permitted to occur without attempts to check it. Only in case it becomes excessive or alarming are hæmostatic measures indicated; then compression with cold applications, and perhaps ergot internally, will be called for. In most of these cases the blood escapes from the nipple, but true hæmatoma may form and in no wise differ from that caused by injury. Ecchymosis—*i.e.* subcutaneous hemorrhage—may be the only evidence of a vicarious flow. It, too, is usually preceded by neuralgia and causalgia of the part. General systemic derangements are common accompaniments of such lesions.

There is also known an absolutely spontaneous hemorrhage which has nothing to do with the menstrual epoch. It seems to be excited by emotion or the hysterical condition, and in all probability is a true apoplexy of the breast. In this case we may have to deal either with a hæmatoma or a hæmorrhœa. Absolute quiet, with ice and an elastic compress, will meet the indications in such a case.

### ACUTE ENGORGEMENTS.

Le Dentu and Verneuil have described cases of acute engorgement of the breast with a certain induration (*selèrème phlegmasique temporaire*), occurring particularly in elderly women, which last for a few days or weeks and then subside. Little or nothing of the real pathology of the complaint is known. Some of these cases had gouty arthritis at the time, and that there may have been some mutual relation between the two conditions is more than probable.<sup>1</sup> Indeed, Verneuil insists on this view.

In his large treatise Cruveilhier has alluded to acute œdema of the breast or simple œdematous hypertrophy, but he connects this rather with the consequences of a local phlebitis and erysipelas. Virchow would completely separate from such a specific œdema that caused by non-specific lymphangitis (*leuco-phlegmasia*, *phlegmasie blanche*, *hydrop-*

<sup>1</sup> *Bull. de la Soc. de Chir.*, 1874, p. 600.

*sic pituiteuse*), which in no clinical respect differs from a similar condition in any distensible tissue.

Le Dentu, however, insists that between such a tumefaction as Virchow describes and the condition manifested in his own cases there is a wide clinical difference. In most of his cases the mammary engorgement was coincident with the disappearance of certain uterine troubles. When we recall how inflammation follows the experiment of temporarily compressing an artery and then releasing it again, it is not fanciful that such a tumefaction may follow some reflex spasm of the vessels supplying the mamma; moreover, considering the intimate sympathy between the breast and the uterus, such a spasm may well have a uterine cause. Considering, too, the extreme blood- and lymph-vascular richness of the part, such an explanation seems to be more than a mere hypothesis.

In the *Ephémérides des Curieux de la Nature* there is related, according to Berard, the "remarkable example of prodigious and sudden swelling of the breasts" observed in 1704 in a woman of twenty-nine. Previously healthy and regular, she washed her feet just as one of her periods was terminating. Immediately the catamenia ceased and her breasts became the seat of pain and swelling, so that in the morning she was unable to rise or move in bed. It continued till she was bled freely from each foot, when within three days the mammæ returned to their proper size (Birkett).

Ferrus has reported something similar in connection with a malarial fever. Most of these fulminating engorgements seem to have occurred in young women. The size said to have been attained, in rare instances, by one or both breasts is almost incredible.

### ACUTE INFLAMMATORY AFFECTIONS.

Pathologically, if not clinically, we can distinguish the following acute inflammatory lesions in the breast:

Mammary adenitis;

Mammary periadenitis;

Mammary cellulitis;

Mammary angio-leucitis, which is usually the specific lymphangitis known as erysipelas;

Retro-mammary cellulitis.

At the outset, however, one must say that either of these occurring in the non-puerperal state, or without some such specific cause as syphilis, tubercle, lepra, actino-mycosis, or malignant pustule, is quite rare. That is to say, the mammary gland when in a condition of physiological activity is easily inflamed and disturbed, but when in a state of repose it is not prone to acute processes. Nevertheless, as the effect of

the extension of other inflammation, or as the result of traumatism, or as excited by absorption of irritating or poisonous substances through abrasions, or, lastly, as a sequel of the acute infectious or exanthematous fevers and of general septic processes, the virgin or quiescent breast may develop all the signs and consequences of acute inflammation in other parts. Such a condition is occasionally met with in the newborn and at or near the commencement of puberty; the latter, of course, can be easily explained as the consequence of the natural physiological hyperæmia carried to excess. This variety is likely to be sub-acute rather than acute; swelling is then at its maximum with a minimum of pain, and, inasmuch as the swollen lobules then can be felt under the external tissues, it must be looked upon rather as a mammary adenitis.

But, just as the periosteum usually "sympathizes" when its underlying bone is inflamed, so, once given an inflammatory process taking origin, say, in the gland-structure proper, the surrounding tissues are almost sure to take part in the vascular and other disturbances; and so, as above remarked, it is not often that these finer distinctions can be made at the bedside. The inflammatory process takes about the same course as in other parts of the body, and its further study as such belongs rather to textbooks on pathology. One may say that, in theory at least, there is a point up to which resolution is possible, and that after this is passed either suppuration or tissue new-formation (chronicity) is inevitable. In practice one finds that this point is placed on a sliding scale, and that the index of this scale is in large degree the index of the patient's general condition. But this holds true of threatened phlegmons elsewhere.

We consider it superfluous to rehearse here the subjective and objective features of mastitis. Occurring in the non-puerperal state, its course is, as a rule, slower and less painful than that of the puerperal cases. The inflammatory foci are more likely to be circumscribed. The same may be said, in parenthesis, of mastitis in the earlier months of pregnancy.

The writer would say here that he is in fullest accord with those recent researches by which it appears that while hyperæmia, and even diapedesis, may be purely matters of vascular disturbance, yet when they are continued and merged into pus-production their consideration is inseparable from a study of the action of the micro-organisms by which they are provoked, and without which clinically they never occur. To this conviction he has been forced both by a study of the labors of others and by his own laboratory investigations. But the consideration of the numerous evidences which compel this belief are out of place in this connection and cannot be here considered.

When mastitis first arises measures looking toward resolution may be

at once established. Individually, the writer prefers hot poultices, feeling that these materially hasten the process whichever way it may terminate. He has also found benefit from a mercurial or compound iodine ointment applied to the surface in connection with continuous poulticing. Internally, laxatives, sedatives, and, if necessary, antipyretics (preferably antifebrin), are indicated.

When the usual signs indicate the presence of pus, the sooner it is evacuated the better. The attendant may, if he choose, convince himself of its presence by means of the hypodermic syringe. Once located, it should be evacuated by an incision so made as to correspond to a radius of the circle whose centre is the nipple, in order that little or no danger may be done to the milk-ducts or the lobules. If the abscess be multiple, so must be the incisions. Each cavity ought to be washed out and drainage properly provided for. If the abscess be large, especially if it be retro-mammary, the opening should be made at the most dependent part, so that drainage may be favored by position, while free counter-opening with through-and-through drainage may be called for. Under such measures success is usually speedily obtained. A metastatic abscess is but a local expression, of course, of a grave general condition, and its prognosis is therefore included in that of the more serious disease. General anæsthesia is seldom required for these incisions; local analgesia is secured by cocaine injections or the freezing spray.

Retro- (or post-) mammary abscess is in no wise different from the other forms, but it pushes the whole breast forward in a significant manner. It has been known to perforate an intercostal space and evacuate itself into the thoracic cavity. There is, therefore, great need for both early recognition and early incision.

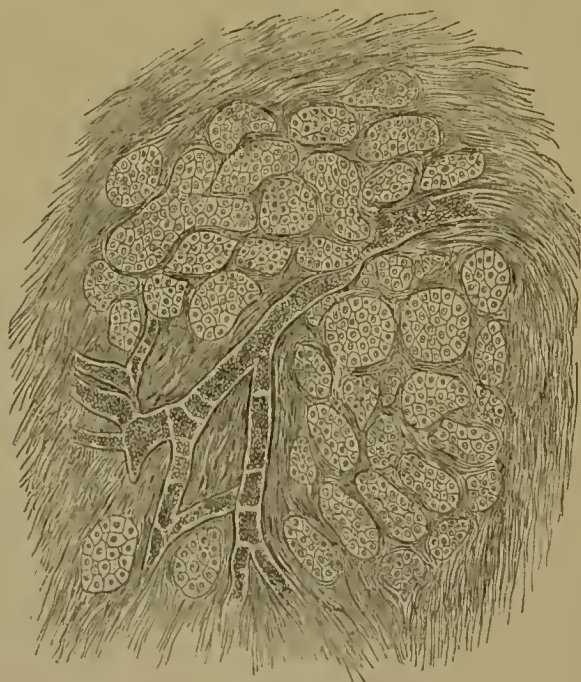
### ERYSIPELAS.

For present purposes it will suffice to briefly consider this topic. Primary erysipelas of the breast is rare; as an extension from affection of neighboring parts it may be met with at any time. It is now known to be an infectious disease of specific nature; further, that the streptococcus which causes it propagates itself by preference along the lymphatic vessels: we have, consequently, to deal with a specific lymphangitis, superficial or deep. As the disease becomes more marked the cocci are not confined to the lymphatics, but permeate to the finest interspaces. Thus, when an abscess results, as it easily may, we are to regard it as a local necrosis of tissues whose life has been sacrificed to the excessive growth of these micro-organisms. According as the trouble is confined to the skin or extends to the proper tissues of the breast its gravity may be slight or severe. Even after the skin over a



large area is involved, recovery by resolution of the specific inflammation and death of the cocci is still possible. The cocci are limited to the skin by a barrier of inflammatory products as by a sanitary cordon, and are disposed of by the leucocytes which are now, in word as in deed, *phagocytes*. But when this has not happened the deeper tissues seem to offer less organized resistance, and then an abscess is pretty sure to follow. Fig. 73 shows the vessels around the acini plugged with

FIG. 73.



Vessels Plugged with Cocci in Erysipelatous Skin (Billroth).

zoogloea masses of cocci. Thus obstructed, they can no longer carry the proper amount of nutriment, and hence tissue death naturally ensues.

For the erysipelatous dermatitis of the mammary region or of any other part the writer prefers the following as a local application to anything he has ever used :

R. Naphthalin (in crystals),	5.
Ichthyol,	35.
Lanolin,	60. M.

For the naphthalin an equal amount of resorcin may be substituted. This to be gently rubbed into the affected surface and around it from two to four times a day. In numerous cases this has given prompt and gratifying relief. Next to this Barwell's plan of applying white-lead paint is perhaps most satisfactory. Experiments with a 5 per cent. trichlorphenol solution in glycerin have not yielded results com-

parable to the effects of naphthalin. Internally, cathartics, quinine, etc., according to the tastes or prejudices of the physician. I have never been able to convince myself that, so long as erysipelas remains a local disease, benefit is to be gained by any internal treatment beyond a laxative or an occasional sedative, unless some complication coexist.

But when the specific process is deep, and consequently serious, then there is need for supporting, and even stimulating, treatment. Then, too, suppuration is imminent, and should be hastened by poultices, always persevering in the local treatment by antiseptics, as above recommended. When pus has formed the case is to all intents and purposes one of abscess, *plus* the specific nature of the pus and débris to be evacuated, which the attendant will do well to bear in mind.

Very lately a few adventurous pathologists have ventured to suggest making practical experiments based upon the well-known fact that malignant ulcers and tumors have been known to disappear after an attack of erysipelas. Working on this basis, Fehleisen and others have deliberately inoculated a hopeless cancerous ulcer of the breast with a pure culture of the streptococcus erysipelatis. A severe attack has been thereby induced, and after recovery a marked improvement has been noticed in the ulcer. A discussion of all the theoretical points involved in these cases cannot be permitted here; the hint is thrown out for what it may be worth.

### CHRONIC MASTITIS.

A chronic inflammation not preceded by one of an acute or subacute nature is, in theory at least, out of the question. So, too, is it in practice, save in those cases which are due to a specific irritant like syphilis or tubercle. Since these cases are to be spoken of by themselves, we have here only to consider those which are perpetuations of acute forms. It is a well-known axiom that chronic—*i. e.* long-continued—inflammation leads to tissue-production, and this usually in the form of fibrous and connective-tissue hyperplasiæ. In the breast this is manifested to the eye more often by contraction than by swelling, and to the finger always by a sense of induration which may be diffuse, circumscribed, or multiple. Such cases may be much cleared up if one can get a history of precedent trouble, such as hemorrhage, contusion, or abscess. A present induration must be distinguished from an acute adenitis of one or more lobules, cold abscess, gumma, cyst, and malignant or benign tumor. Sometimes the diagnosis is easy; sometimes it may only be made by a process of exclusion.

Fig. 74, from Billroth, gives an idea of what changes atrophy and induration may together effect. The connective tissue increases, but so much pressure is made on the gland-structure proper that it disappears;

as a consequence, the volume of the breast is decreased. In case of previous abscess-formation this condition of chronic inflammation may be combined with the existence of one or more fistulæ. The condition corresponds perfectly with that described in 1838 by Velpeau as *induration en masses*, and by Sir Astley Cooper in 1845 as *chronic mammary*

FIG. 74.



Combined Effect of Atrophy and Induration.

*tumor*. Although, when seen, it may have nothing to do with the puerperal state, it is rare in those who have not been pregnant. At times it is accompanied by great pain, at others it is almost painless.

Marens Beek speaks<sup>1</sup> of a chronic lobular interstitial mastitis of one or more lobules, occurring most often in women near the menopause, and most common in those who have borne children. It frequently gives rise to severe neuralgic pain, aggravated at the menstrual epoch. A hard nodule is felt, firmly imbedded in the gland-substance, but without adhesion of overlying structures. Under the fingers it gives a sensation as of leather, rather than as of stone. After it has reached a certain size the disease becomes stationary, the pain usually subsides, and no further trouble is experienced. Several such lobules may be felt, and both breasts may be thus affected.

Quite recently Phocas has described these nodules at length under the title *maladie noueuse de la mamelle*. He speaks of two forms—that subsequent to abscess, which appears in women advanced in years; and that of spontaneous origin in younger women. The latter he ascribes

<sup>1</sup> *Heall's Dictionary of Surgery*.

largely to compression from corsets and to menstrual derangements. According to Phocas, the commencement of the disease is often slow and insidious; the patient discovers by chance that she has an enlargement of the breast, but often also pain is the first symptom to appear. When the disease has reached its full development there is almost nothing to be seen except a very slight deformity. On examination from before backward one almost always finds a movable, distinct tumor, whose size varies from that of a hazelnut to that of a large walnut, whose consistence is firm and resisting. Superficially situated, it is in general separated from the skin by a small quantity of soft tissues, and is of the mobility of adenomata, to the extent of being capable of displacement from two to three fingers' breadths in all directions, offering the sensation of a foreign body in the gland. But further exploration shows that this tumor is by no means isolated; at a greater or less distance from the principal tumor there exist a large number of other prominences, separate from one another by small intervals. The size of these nodosities varies from that of a pinhead to that of a pea. Their consistence is the same as that of the principal tumor. That which distinguishes them specially from the principal tumor is their perfect connection with the mammary gland. If one takes the gland between two fingers, one can quickly determine that all these little prominences are an integral part of the gland, which is, one might say, sclerosed, especially in its upper third, where one finds a quantity of these nodosities, which are disseminated irregularly in the substance of the breast. One might imagine that he had pricked a great number of pins into its substance, and could feel the heads through the skin. As to the principal tumor, its mobility is not absolute; it is limited by a pedicle which it is usually possible to find on searching across the tumor, but it has no connection with the skin. As to functional signs, they are reduced to pains, very variable according to the case, but which in some circumstances are so intense as to constitute one of the forms of the disease which has been described under the name of irritable tumor of the breast.

The course of the affection is fitful. There are alternations, oscillations, in the volume of the tumor; its termination may be by spontaneous recovery or by treatment which consists in compression; and it is the disappearance of these tumors which has led to the belief in the cure of cancer by certain forms of treatment.

There are also cases which one might call "*frustes*" (incomplete), in which the tumor exists alone, without being accompanied by those little nodosities which give its particular character. These are the cases which are most difficult of diagnosis. This is based especially upon the fact that the *maladie noueuse de la mamelle* succeeds in certain cases to abscesses, and in others is the result of a known irritation; that on



palpation it is composed of a principal tumor, mobile but pediculated, accompanied by a multitude of little disseminated indurations in the thickness of the breast, which contract intimate connections with the gland; that it is often bilateral; that it advances in an irregular fashion and by jumps, and finally terminates favorably. But in the incomplete form—that is, without the nodosities and fibromata—the resemblances are such that the diagnosis becomes very difficult, and so that one may ask if there is not an identity of nature between benign tumors and this form of mammitis. These tumors would be only a more advanced state of the affection which it is important not to misunderstand, since in this case all operative measures are contraindicated.<sup>1</sup>

In the matter of treatment, in simple cases one should try those measures which are known to benefit chronic inflammation in other parts. Among these the so-called sorbefacients deserve a certain amount of the repute in which they are held. Among these perhaps two deserve special mention: these are mercury and iodine, and they are most efficient when they are rubbed up with lanolin as a vehicle, by which their absorption is very much promoted. The effect of the combination is still further heightened when a small proportion (15 per cent.) of ichthyol is added. A 10 per cent. oleate of mercury ointment, made up with lanolin and ichthyol, or a 2–4 per cent. iodine ointment in the same vehicle, will produce as much effect as any remedy of this class can. Perfect freedom from local irritation should be ensured and the general condition of the patient attended to.

But a mamma thus affected, which is always troublesome, and which does not become at least comfortable after treatment, or which is evidently beyond it, is to be viewed with the same suspicion as attaches to a man known to be a thief. It is well known that malignant degeneration may supervene at any time, especially as the menopause approaches, and consequently the best interests of the patient *may* dictate operation—either total removal of the breast or excision of the painful nodule. The attendant risks are now-a-days so slight that they may be almost disregarded in the face of the resulting benefit. This is in consonance with a general rule which make it advisable to remove any accessible organ or portion of the body which has become functionless, intolerable, and a source of future risk.

One incidental feature or consequence of chronic inflammation, so rare as scarcely ever to find mention, is the formation of calcareous nodules in the breast, apart from their occurrence in a true neoplasm. In the mammae of the canine race they are not rare, but in our species they have been met with exceedingly infrequently. Gross has twice met with such cases in elderly women. Bassius—so says Morgagni—met

<sup>1</sup> *Courier of Med.*

with a collection of calculi in the mamma which gave forth a sound on shaking the breast. Rufus, Levinus, and Lemnius have cited cases; so have Bonnet, Morgagni, and Cooper. Berard met with a calcareous condition of the entire breast; but as his description was written in 1812, before either our terminology or our anatomical knowledge was as exact as it is now, we are left in doubt as to whether it was a true calcification of a chronically inflamed breast or an enchondroma or osteoma. At all events, Velpeau places no high degrees of credence upon Berard's report.

These chalky masses lie sometimes in the connective tissue, sometimes in the milk-ducts, where they remind one of phleboliths. The latter are to be viewed as we view salivary calculi: of the former we are not in position to speak with certainty. Of themselves, they do not necessarily call for removal. When connected with tuberculous processes they are to be included in their proper category of tuberculous products. If atheromatous in origin, their significance is lost in the more important underlying general disease.

Quite recently Heudoupe has put on record the following case:<sup>1</sup> He was consulted by a woman of thirty-five for what she called an abscess of the breast. There was a large, irregular ulceration on the upper part of the left breast, from which creamy pus freely escaped. The cavity of the abscess was three-quarters filled by a hard tumor which gave a sensation of porous stone to the probe. The part was benumbed with a spray of ether and the calcareous mass was removed. It was about the size of an egg. The antecedent history of the woman was as follows: At the age of fifteen she hurt the left breast in a fall. A painless tumor the size of a nut developed in the breast. The woman married and had two children, which she nursed. She noticed the secretion of milk was always more profuse from the diseased breast. Four years before the calcification was removed another traumatism to the breast occurred, and an abscess developed which was opened, and a fistulous tract was left which persisted.

### MAMMARY FISTULÆ.

These are the remains of previous suppurative lesions, and mean either that the case was insufficiently or improperly attended to earlier in its course, or that the pus-tracts and drainage-outlets are prevented from healing by some diathetic condition, usually syphilis or tuberculosis, or both. In case of multiple mammary abscess mistakes are sometimes made in not making incisions freely and numerously. The peculiar structure of the breast permits burrowing of pus, and it happens once in a while that the gland becomes riddled by pus-tracts.

<sup>1</sup> *Gaz. des Hôp.*, Aug. 25, 1887.

Unless, now, each of these be, at the time of opening the abscess, sought out and laid open, a fistula may result. The tuberculous or cold abscesses when not early recognized are prone to work their way toward the surface and thus provide themselves with vents. A cavity thus emptying itself in time contracts till it is in effect a fistula.

Empyæmic collections of pus have been known to escape from the thorax and present thoracic fistulæ behind or at the margin of the mammae. Lastly, caries of the ribs may cause a collection of pus and débris which may come to the surface in the same location.

In all cases the cause of the fistulæ must be first traced, and then the effort to remove it made. Thus a breast which is shrunken and riddled with sinusses had better be removed. Individual sinusses may be treated as are rectal fistulæ—*i. e.* freely slit up. In connection with those of long standing one need not hesitate to incise freely, since by their presence they have probably already caused obliteration of those ducts which one might otherwise hesitate to cut across.

If the case be one of empyæma, it is in no sense gynecological, and should be turned over to the general surgeon. So too when caries of an underlying rib is the prime cause; and here, again, it may be possible to lay up the breast and remove the source of the trouble without sacrificing the gland.

In all cases, whether tuberculous or not, the operator should never content himself with simply incising such a passage; it should be thoroughly scraped with a sharp spoon until bleeding tissue is reached in every direction. Only by this means can all source of possible future trouble be removed. As will be seen, with the milder treatment by injections, etc. the writer has no sympathy save in the simplest possible cases. When a fistula connects with an enlarged milk-duct or lobule, it had better be also completely extirpated or obliterated.

#### TUBERCULOSIS MAMMÆ.

This is a subject very sparingly handled, or even barely mentioned, in the ordinary textbooks, and the paucity of its literature is obviously caused by the indifferent information we have concerning it. In 1881, however, appeared Dubar's monograph, *Des Tubercules de la Mamelle*, comprising a summary of what little had been previously published, in connection with his own very careful studies and examinations. To this the writer, like every other student of the subject, must acknowledge his indebtedness. Other very instructive articles by Ohnacker, "Die Tuberculose der Weiblichen Brustdrüse,"<sup>1</sup> and by Le Dentu, "Tubercules de la Mamelle,"<sup>2</sup> will well repay perusal.

Certain it is that very few cases have been accurately observed.

<sup>1</sup> *Archiv f. klin. Chir.*, 1883, xxviii. 366.

<sup>2</sup> *Rev. de Chir.*, 1881, i. 27.

That which Sir Astley Cooper spoke of as "serofulous tumor of the breast" was undoubtedly one of the manifestations of tuberculosis, just as is every decided "serofulous" tumor. What Velpeau described as tubercles in the skin over the mamma were probably disseminated cancerous nodules. Nevertheless, he described three manifestations of tubercle in the breast: *a. Tubercules disséminés; b. Tumeurs lymphatiques; c. Tumeurs lymphatiques purulentes.* After Velpeau, Nélaton<sup>1</sup> and Bérard<sup>2</sup> paid scant attention to the subject, and Johannet in 1853 wrote his thesis upon the subject.<sup>3</sup> So Cornil and Ranvier were quite wrong in saying, in their *Treatise on Histology*, that "examples of tubercles in the breast are unknown," though Cornil has since written of tuberculosis of this gland. Klotz published also a brief article in 1879.<sup>4</sup> Kolessnikow has described a form of necrotifying interstitial mastitis of cows as one of the local manifestations of *perlsucht*;<sup>5</sup> and something of the same kind is probably to be met with in rare cases in our own species. In his work on *Diseases of the Breast*, Billroth also gives an excellent summary of what has been learned of this condition.

One thing in this connection is absolutely certain, and that is that many cases of this nature are overlooked entirely or are confused with other local conditions from which they ought to be clearly separated. The better, therefore, that the condition is understood, the sooner can this separation be made—a matter of no small importance in the patient's interest.

The commonest manifestation of mammary tuberculosis is to be met with in cold abscesses and chronic fistulæ. Aside from these we have to deal with disseminated tubercles and tuberculous gummata or infiltrations. Infection *in loco* having occurred, the disease takes much the same course as in the lungs. Multiple true tubercles are formed, having as their foci giant-cells, and these foci may for some time remain separate or they frequently coalesce, and then we have the confluent form. To these succeeds caseation, with liquefaction in one case and calcification in another, or they may undergo atrophy, and so spontaneous cure ensue.

In the disseminated form the breast is but slightly augmented in size, and is quite movable over the ribs. On section a variable number of nodules are met with, of various sizes, of yellowish-gray color or with yellow centre surrounded by a grayish zone somewhat pearly in appearance. The surrounding tissue has a pretty natural appearance, though slightly firmer than natural. Under the finger the nodules are somewhat hard, but friable, sometimes presenting a soft-

<sup>1</sup> *Thèse d'Aggrégation*, 1839.

<sup>2</sup> *Diagnostic différentiel des Tumeurs du Sein*, 1842.

<sup>3</sup> "Diagnostic des Tumeurs cancéreuses et tuberculeuses du Sein," *Thèse de Paris*.

<sup>4</sup> *Archiv f. klin. Chir.*, Bd. xxv.

<sup>5</sup> *Virchow's Archiv*, Bd. lxxvii.



ened interior. In other words, they tend slowly to caseous degeneration, and by acting as irritants tend to cause consolidation of adjacent tissue. Bauchet has gone so far as to ask whether the subsequent calcification of these masses may not be mistaken for osteoma. The microscopical appearances are consistent with the grosser changes thus far mentioned.

In the confluent form the swelling is much more marked and is unsymmetrical. Near the point of greatest swelling fistulæ will be often found. The nodules can be felt to be irregular, bosselated, rather immovable, while the less affected parts of the breast are felt to be studded with nodules. On section there are found irregular cavities and passages, the latter all leading into or out of the former and often communicating with the exterior. The cavities and sinuses are lined with the so-called pyogenic membrane so significant of tubercle; and this may be covered, here and there, with granulations of an unhealthy appearance. It has an average thickness of a line, and can be stripped off from its attachments. The balance of the mammary tissue is indurated, pale, fibrous in aspect, corresponding much to the appearances of fibroid phthisis. It is more or less studded with fine nodules consisting of miliary tubercles. While this may be regarded as a more advanced stage of the previous form, it yet represents the disease as we oftenest recognize it.

A true miliary form may, probably does, exist, but is not yet sufficiently known to bear description, most likely because patients presenting it are not seen sufficiently early—*i. e.* they have passed the miliary stage by the time they apply for treatment.

In the disseminated form the nipple is scarcely altered in appearance. By palpation, rather than inspection, are the various indurations perceived. Their number is in inverse proportion to their size. Most of them will have a size about that of an almond; they have a certain mobility while yet fixed in their beds, and are quite firm and solid. There is little or no accompanying pain. The progress of the disease is very slow, while considerable periods of time may elapse without any advance. Their termination is uncertain: sometimes they disappear in whole or in part. Sometimes a cold abscess forms, and they are thus disposed of. According to Billroth, they may persist through life without much change.

With the confluent forms it is hardly so. They pursue a steadily unfavorable course, and by fusion of separate foci form larger masses by which the volume of the breast is considerably augmented. All this may go on without noticeable inflammatory reaction; in more acute cases, on the other hand, there are general and local febrile disturbances, decline of appetite, pain, and tenderness. The pain is sometimes even lancinating and radiating. Lymphatic glands in the axilla

and neck may be involved, and the whole clinical picture may much resemble an acute onset of malignant trouble. Distinct tumors may be felt, and the skin over the incipient tuberculous abscess may have the characteristic appearances. The neighboring surface will probably be bosselated, the particularly suspicious tumor but slightly movable, giving on palpation an uncertain or indefinite sense of fluctuation. Exploratory puncture may yield pus or fluid débris. If the foregoing signs are met with in connection with existing fistulæ, the evidences of tuberculosis are indubitable.

*Cold Abscess.*—From such tumors as those made by the confluent form of mammary tuberculosis above described cold abscesses of the breast are formed. Besides these must also be included those which have an empyæma or a carious rib as a cause. Our knowledge of this class of pus-collections is now so definite that we may say a cold abscess is always a tuberculous abscess. While such purulent dépôts are commonly found in connection with the scrofulous diathesis, we may yet meet with them in patients who show no other sign of existing tubercular disease, and who are apparently very far from phthisis. In fact, they only make stronger the constantly-accumulating evidence that tuberculosis, like most cancers, is, at first at least, a local affection, and therefore curable in proportion to its accessibility.

While there may be room for doubt in the case of supposed tubercular nodules in the breast, and differential diagnosis may call for a high degree of ability, the recognition of a cold abscess should ordinarily be very easy. If doubt still remains after eliciting the history and examining the part, the exploring trocar will clear it up. And if the character of the fluid be still doubted, the microscope will speedily disperse the doubt. A search for the distinctive tubercular bacilli may not be rewarded with success, since the pus may be so old that its pathogenic organisms have died and disintegrated; still, they are often to be found.

Of the conditions which are capable of conducing to tubercular disease, three only deserve mention—viz. trauma, pregnancy, and lactation. Trauma can only be a factor when it calls forth a low grade of chronic inflammation. The other conditions conduce to extensive structural changes and peculiar activity, and their influence must be quickly appreciated. In one of Ohnacker's cases the disease began while the patient was in the puerperal state; in one of Le Dentu's, a breast in which the disease had apparently almost completely subsided was seriously disturbed by subsequent pregnancy.

It would seem to be a matter of the gravest import that mammæ thus involved should not be put to physiological use again. All possibility of infection from nursing mother to suckling infant should be

obviated. Kolessnikow's researches above alluded to make clear this possible source of danger.

With respect to treatment of tuberculosis of the mammary gland there is but little to be said. Palliative treatment will comprise adequate protection from irritation, such sedative or sorbefacient applications as the practitioner may have faith in, and such general constitutional treatment as may be indicated. The only efficient and radical treatment is extirpation of the entire gland, with removal of any affected axillary glands. This may be regarded as final and curative. If any fistulæ have tunnelled into the surrounding tissues, they should be either dissected out or thoroughly scraped, since they are as tuberculous as is a cold abscess, and need just as severe treatment.

**LUPUS OF THE BREAST.**—Inasmuch as the preponderance of evidence is now in favor of the tubercular nature of lupus, and inasmuch as a great majority of cases of lupus of the skin and mucous membrane are certainly manifestations of local tuberculosis, this is a suitable place in which to allude to the possibility of its occurrence, though very rarely, around the nipple or on the breast. Its pathology, etiology, and general appearances in no sense differ from those of lupoid lesions of other parts. The essential features in its differential diagnosis, along with particular details concerning the above, are so fully and frequently treated of in surgical and dermatological literature that, having alluded to its appearance, they would be superfluous here.

The treatment consists either in complete curretting of the affected surface or else exsection of all the involved tissue.

#### EXPLANATION OF PLATE III. (FROM DUBAR).

FIG. 1.—Section of a Mammary Gland, showing the lesions of confluent tuberculosis: *A*, fistulæ communicating with the central cavity, *C*; *B*, diverticulum from same.

FIG. 2.—From the immediate neighborhood of *C* in Fig. 1: *A*, section of lobule, showing a few ducts still preserved, the balance being lost in the cellular infiltration; *B*, giant-cell; *C*, caseous nodule.  $\times 60$ .

FIG. 3.—Section made at a distance of 3 cm. from the foregoing. Lobular infiltration much less distinct. At *A* and *B* are seen the ducts, whose identity is not yet crushed out by the proliferating cells surrounding them.  $\times 60$ .

#### SYPHILIS OF THE BREAST.

**PRIMARY SYPHILIS.**—*Chancre.*—While not in any sense a disease of lactation, chancre of the nipple and areola is more often found, in this country at least, upon nursing mothers or wet-nurses than under other circumstances. For example, an infant presents, recognized or unrecognized, evidences of inherited syphilis, usually mucous patches. The nurse, having already some fissure or abrasion of the nipple, acquires the disease by immediate contagion. It is possible for the mother also to thus acquire primary syphilis from her own child with-

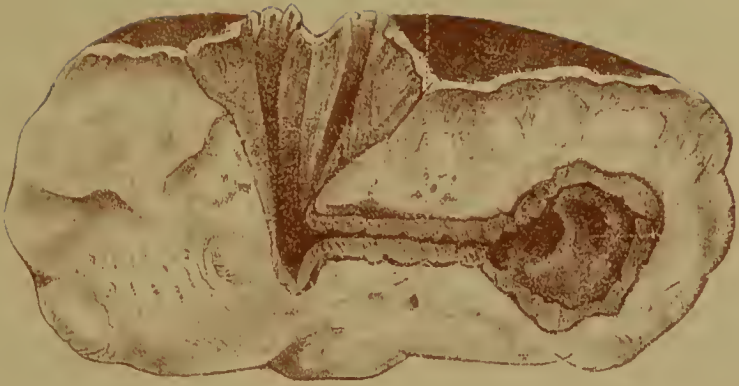


Fig 1

B

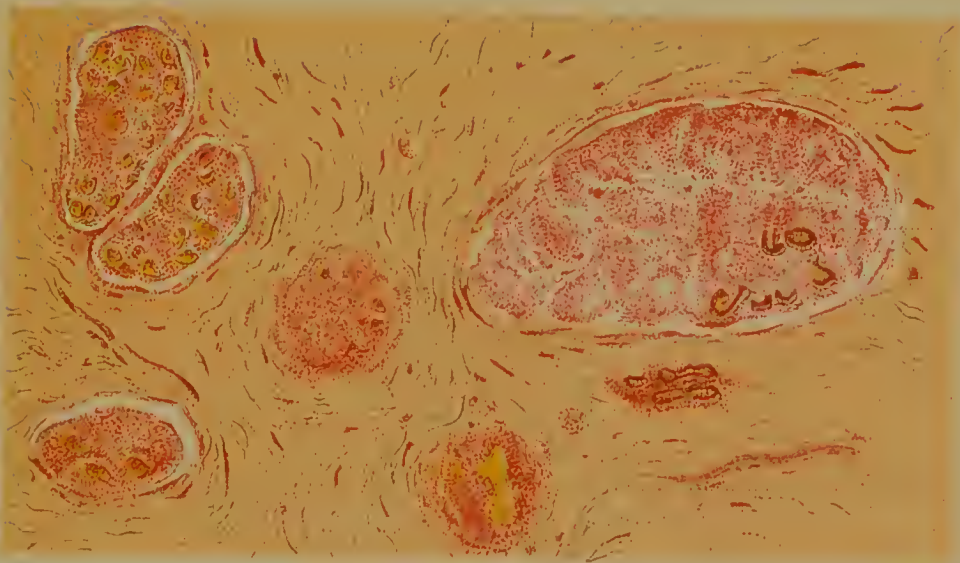


Fig 2

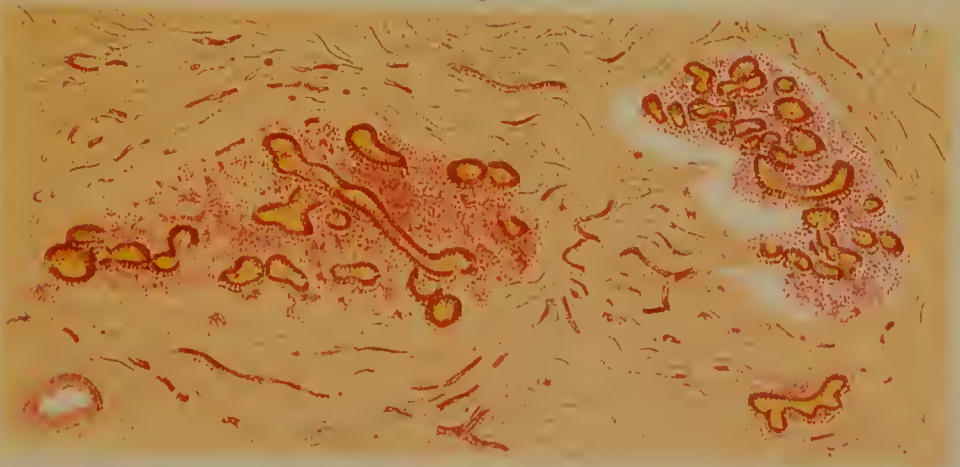


Fig 3

Section of a Mammary Gland showing  
Lesions of Confluent Tuberculosis.





out violating Colle's law, though at first it might be regarded as an exception. Such a case proves, according to Hutchinson,<sup>1</sup> a striking support of it, since it shows that when the mother has not yet suffered from it—*i. e.* has been protected—she may yet contract the disease from her own offspring.

Aside from chancre thus acquired from nursing infants, they may be contracted from the buccal lesions of a lover or by some mere accident without depravity.

Those acquired from infected children may present "large, deep, indurated ulcers, brawny excavations, excoriated or ulcerated indurated fissures, or flat mucous papules more or less livid, moist or dry, scaly or scabbed, sometimes but little indurated" (Keyes). Indeed, Fournier has published one case with seven papules on one nipple and sixteen on the other.<sup>2</sup>

The DIAGNOSIS must be made upon the history, the general appearance of the chancre, the induration of its base, the axillary or cervical adenopathy, and perhaps the results of confrontation. If in doubt as between chancre and chancreoid, the test by auto-inoculability may be tried. Furthermore a few weeks' time will clear up the matter if a chancre exist, since secondary symptoms are not likely to be long delayed.

Implication of adjacent lymph-glands is an almost invariable feature of primary specific disease. In the case of chancre of the breast these will be found enlarged in the axilla and above the clavicle. Sometimes the inflamed lymphatics can be plainly felt underneath the skin like fine cords, or can be traced by the color lines caused by the accompanying perilymphangitis.

After the healing of the chancre and the subsidence of the adenopathy the site of the primary sore is likely to be long marked by an induration.

The chancre itself needs only the mildest local treatment, but the patient should be at once placed upon a prolonged course of mercurials in some shape.

SECONDARY SYPHILIS is most frequently met with in the form of mucous patches and moist papules. The secretions from all secondary lesions are very infectious; and, if the raw surface of the former be irritated its discharge may become so far auto-inoculable as to get a pustule or an ulcer somewhat resembling a chancreoid, while the discharge from a moist papule causes another. In fact, any syphilitic papule may be converted into a mucous patch if subjected to heat and moisture. Hence under large and pendulous mammaræ, or in the case of exceedingly obese women, a good place to look for surface indications of syphilis is beneath the overhanging breast.

<sup>1</sup> *Syphilis*, p. 119.

<sup>2</sup> *Gaz. des Hôp.*, Dec. 1, 1877.

The discharge from all these moist lesions is in every respect as infectious as that from a fresh typical chancre.

Besides these there are the ordinary forms of pigmentary and other syphilides which may be seen on the breast as well as elsewhere. The polymorphism of these manifestations is notorious.

Fournier has shown that anæsthesia or analgesia of the breast is an occasional manifestation of the late secondary stage of the disease.

Along with the surface manifestations there go the implication of the lymphatic glands, and perhaps the facial hyperæmia, the elevation of temperature, or the evidences in the patient's irides,—all of which will be noted by the careful attendant at the first examination.

TERTIARY SYPHILIS in or on the breast is marked either by the development of rupia, cethyma, or late mucous patches externally, or internally by a so-called syphilitic mastitis, which is inseparable clinically from the formation of syphilomatous new-formations or gummata. These seem to have been alluded to by, among the first, Boissier and Sauvages, under the name *cancer vérolique des glands mammaires*, but which, as we now know, have nothing about them of a cancerous nature. Our best information concerning gumma of the breast is summed up by Landreau in his thesis published in 1874.<sup>1</sup>

According to Lanceraux, two distinct forms of specific mastitis are to be recognized—*diffuse* and *circumscribed* or gummy. The former is marked by an indolent swelling without change in the color of the skin, accompanied by axillary adenopathy, with little or no pain. It is usually bilateral. The latter, better known, comprises the existence of gummata, either subcutaneous or in the tissue of the gland. They are slow in growth, indolent, frequently discovered by accident, firm, bosselated, and usually without enlarged axillary glands. Later, little by little, the tumor softens in its interior, becomes more adherent to its overlying skin, which latter takes on a deeper hue, and then ulcerates through and discharges a débris. After this evacuation, even without much treatment, the parts heal with a deep, circular scar, pale at its bottom, copper-colored around its margin. On account of their rarity gummata are frequently mistaken for malignant tumors. In one case Richet was led into this error and prepared to extirpate a breast, but just before making the operation found, by accident, a tumor in the patient's calf. This made him pause and hesitate; then he gave up the notion of operating, and put the patient upon potassium iodide; after a short time both tumors disappeared.

In the matter of differential diagnosis it is enough here to simply remind that a patient with gumma of the breast will, in all proba-

<sup>1</sup> "Sur les syphilomes mammaires," *Thèse de Paris*.

bility, present some other evidence of specific disease or it will appear in the history of the case.

Cases of gumma have been described by Yvaren, Maisonneuve, Vernenil, Ambrosoli, Hennig, Marin, Biercher, Landrean, Cheever, Boeck, Lang, and others.

According to Hennig, an induration, or even a gumma, may occur in the breasts of those who are victims of hereditary syphilis.

In regard to TREATMENT little need be said here. Mercury, externally, internally, sometimes almost eternally, and preparations of iodine in the later stages, constitute our main reliance in these cases. Certainly not in our generation will be found any remedies which shall supplant them in professional esteem. One kind thing may always be said of syphilis: that while its *neglected* effects yield to no morbid conditions in point of disgustingness and horror, there is no other disease in the entire list which yields with so much certainty to the *judiciously* directed action of remedies as does syphilis to the two above named.

It seems, moreover, to be now clearly established that syphilis is *curable*, at least in most instances, and that consequently hope can be held out for all who have time, patience, and the good-fortune to be in proper hands.

### MASTODYNIA; NEURALGIA OF THE BREAST; IRRITABLE MAMMA; MAZODYNIA (Birkett).

This is an excessively annoying, sometimes severely painful, affection, of which much is seen clinically and but little known pathologically. For convenience it would perhaps be well to divide these cases into two classes: those in which no structural alteration can be perceived, and those in which the presence of a nodule or an indurated lobule, or of a small subcutaneous tumor, can be made out. To this class belong those cases which Sir Astley Cooper has spoken of under the heading *irritable tumor of the breast*.

If the term "neuralgia" implies that we are ignorant of the cause of a given pain, then the cases in the first category may be with propriety considered as neuralgic: something is at fault, but just what we do not know.

In the second class of cases there is some change discoverable on palpation; this may be some small neoplasm or a localized or diffused chronic inflammatory process. It is not difficult to believe that some nerve-fibrils have been so caught in the new growth or entangled in the inflammatory tissue-change as to be pressed upon, and thus give rise to pain, just as does an inflamed dentine or a carious tooth. To



prove this may be difficult, but to assert it is to keep within the bounds of reason.

In either class the symptoms are about the same. The part, always tender, will ache for some hours after handling, the sensation not being confined to the breast, but radiating to the shoulder, arm, and side. In bed the weight of the breast is intolerable, and the patient cannot lie on that side. Causalgia is a frequent complaint, and the pain is sometimes like that of *tie-dououreux*. When the pain is most severe there is frequently nausea. Sometimes corsets cannot be worn or the clothing has to be specially arranged. In some cases light pressure over the points of exit of the middle and anterior branches of the intercostal nerves causes intense pain (Birkett). In almost every instance the pain is aggravated before and during the menstrual period. Patients thus affected are usually tortured by fear of cancer; and this fear, preying upon their minds, is calculated to aggravate their condition.

With patients in Class I. we find, on examination, nothing save extreme tenderness, which may be localized or diffused, or may indeed be noted in each bosom. Patients of Class II. will present either small, movable, sensitive nodules, in almost every instance fibromata or adeno-fibromata, or will give unmistakable evidence of a chronic lobular interstitial mastitis of one or more lobules. No matter how much pain is complained of in the shoulder, no enlargement of glands is detected in the axillæ.

These patients have almost invariably passed the age of puberty; some will have passed the menopause. They are usually of an hysterical or neurotic disposition; many of them are erotic. Previous lactation, with subinvolution as physiological activity subsides, is the apparent cause in some. Others will ascribe their troubles to injury; in many no satisfactory cause can be assigned. One of my patients, a young woman, had such irritable mammæ that she could scarcely dress comfortably; the slightest accidental tap upon her bosom would almost make her faint. She was extremely erotic, had been a confirmed masturbator, and had had uterine and vesical disease.

I had occasion to remove a small adeno-fibroma of the breast in the case of a young woman who complained of excessive pain and radiating disturbance. In spite of local anæsthetics, the pain of operating was bitterly complained of. Pain persisted long after its removal, to finally subside; but for years after the scar, now slight and perfectly movable, was and still is the centre of an area from which radiates constant discomfort and often distress. She has uterine displacement, and is of an erotic temperament, her struggles to subdue the latter seeming to augment the mammary distress.

A lady came two hundred miles to see me with the fixed purpose of having me remove her left breast, supposing that she had cancer, and

having arranged all her affairs to that end. I found slight evidence of a low degree of chronic diffuse inflammatory disturbance, but there was only little change to note on comparing the healthy breast with the painful one. I sent her directly home again, with directions as to her hygiene, diet, etc. and an iodine-and-belladonna ointment for local use. I saw her several months later and she was quite relieved in body and mind.

A maiden lady consulted me, complaining bitterly of a painful nodule in one breast. I learned that in another city a physician had withdrawn by aspirator an ounce of colorless fluid from a cyst, and that the nodule she complained of was the shrunk remains of that cyst. The pain was, as usual, out of all proportion to the apparent gravity of the case. She could not lie on that side at night, nor wear corsets nor use the corresponding arm. In the course of a few months the nodule entirely disappeared under but little treatment, and her pain vanished with it.

These are illustrative cases of what is frequently called neuralgia of the breast. No such pain as these patients complain of is felt in any malignant tumor so early in its course or until it is plainly and conspicuously malignant, and the very excess of suffering and of tenderness is the significant feature of the neurotic cases.

These cases are by no means rare. In four years, for instance, Velpeau saw 40 of these neuropathic affections of the breast; in 21 the right breast was affected, in 17 the left, and both in 2 of them. Of these women, 15 were under thirty years of age, 7 between thirty-one and forty, 8 between forty-one and fifty, 7 between fifty-one and seventy, and 3 were over seventy. In 10 some slight induration was found; in the balance he could discover no alteration.

Many of these cases are doubtless reflex neuroses, the primary trouble being sometimes in the digestive and assimilative organs or in the gouty diathesis, and sometimes in the pelvis. Menstruation is usually deficient or deranged.

TREATMENT must be directed to removing the cause if possible; if this be impossible, then it must be tonic and symptomatic. A painful nodule had better be removed. A purely hysterical case needs moral and mental treatment as much as physical. An erotic female, if single and otherwise ready for it, may be safely advised to marry, and pregnancy will probably put an end to her mammary neuralgia. In certain purely neurotic cases the actual cautery may be applied with benefit or an ignipuncture may be advisable. Sedative ointments oftentimes palliate if they do not cure. Rectification of a uterine displacement will give great relief. Overcoming intestinal atony and relieving hepatic engorgement, as indicated by the existence of hemorrhoids, etc., will practically cure some of these cases. Swinging up pendulous neural-

gie breasts in a sort of suspensory is of great advantage. Massage, salt-water bathing, the constant current, faradism, systematic exercise, etc. will be indicated in many cases.

Finally, the breast, like the neuralgic testicle, is only to be removed as the last resort in patients who have resisted every treatment and as to the genuineness of whose symptoms there can be no doubt. I can imagine a case which might justify removal, but have never personally known of one, though Birkett speaks of two instances of this kind.

#### SYMPATHIES OF THE MAMMÆ WITH OTHER ORGANS.

It is made in many ways to appear that the mammæ are in strong sympathy with the pelvic viscera. Many women with ovarian or uterine disease complain bitterly of the mammæ, and we know how many cases of mastodynia are afflicted with some pelvic disturbance. Many women have irritable mammæ before or during each menstrual epoch, and many young girls approaching puberty have more or less engorgement or tenderness of the breasts. Some women confess that any handling of or toying with the mammæ, even by one of their own sex, will arouse strongly erotic desires. Quite recently Dr. Strong of Westfield, N. Y., has recommended the application of mild mustard sinapisms to the breasts to hasten a retarded menstrual flow, claiming to have been rewarded by success in numerous instances.<sup>1</sup>

It is quite possible that the clinical fact that diminution in size of the breasts is now and then noted after a sharp attack of mumps may have given rise to some of the disrepute into which that disease has fallen, since many of the laity believe that it often leaves patients of both sexes sterile or impotent.

There may be added, perhaps, that the breasts constitute notable hystero-genetic centres, pressure upon or irritation of which in susceptible subjects may call forth the various phenomena of hystero-epilepsy, at times in mild degree, at times to the full extent.

<sup>1</sup> *Med. Press. West. N. Y.*, March, 1886, p. 259.

# FISTULÆ.

By EDWARD W. JENKS, M. D., LL. D.,

DETROIT.

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DEFINITION.—By the term “fistula,” when applied to the genital organs of woman, we understand a solution in the continuity of the utero-vulvar canal, resulting in the establishment of an unnatural communication between these organs and a neighboring viscus, tube, or cavity.

ETYMOLOGY.—Taken in its classical signification, the Latin *fistula* indicates a reed, a flute, a pipe; that is, a hollow instrument of greater or less length. It needed but a slight modification of its meaning, however, to make it expressive of a morbid condition in which the fluids of a part passed through an unnatural channel to the free surfaces of the body, and it was early used in that sense. In its practical and clinical use the idea of length as a qualifying factor has been lost sight of, the term being as readily applied to simple orifices which directly connect a viscus or cavity with the exterior as to long and sinuous channels.

The two great divisions of *Fistulæ* we have to consider are the urinary and fecal *fistulæ*, the former giving exit to the urine through the vagina, the latter to the contents of the bowel.

## URINARY FISTULÆ.

HISTORY.—The operation for the cure of fistula is of recent date, and among the many achievements of modern surgery this may be ranked as one of the greatest. Sufferers from these affections, debarred from the society of family and friends and obliged to lead a cheerless, despondent life of isolation, are now by the triumph of surgical art restored to health and happiness.

A search in the writings of physicians of antiquity is barren of results. Apparently they had no idea of urinary *fistulæ* as found in women, though it would seem that the disgusting nature of the malady ought to make its existence evident to an ordinary observer.

Hippocrates, indeed, does speak of a flow of urine following diffi-



cult labors, but the terms used and the method of original treatment advised refer to a simple incontinence of urine rather than to its escape by a fistulous opening. The reason of this deficiency in the ancient records of pathological conditions has been attributed, on the one hand, to the supposed rarity of fistulæ in the women of that day, the customs and manner of living rendering them but little liable to these accidents of childbirth; and, on the other hand, it is alleged that fistulous openings may have been of frequent occurrence, but were unobserved because the practice of midwifery was entirely in the hands of midwives. Hippocrates lays down the precept to relinquish the lying-in to the care of women, and to reserve to men the more difficult obstetrical operations. This custom prevailed for a long time, and even as late as the beginning of the seventeenth century Bartholini wrote that the art of midwifery was *infra viri dignitatem*, and that men disdained to apply themselves to it.

Whatever may have been the cause of this omission on the part of medical writers, it is probable that fistulæ were not rare before the discovery of forceps, since physicians then had no control over difficult labors, nor means of terminating them in cases of exhaustion.

We find no mention of urinary fistulæ until the time of Ambrose Paré in 1570, who proposed a method for the closure of vesico-vaginal fistulæ. Van Roonhuysen<sup>1</sup> of Amsterdam was the first, however, in 1660, to devote himself to finding a method for the radical cure of these affections. He laid down correct surgical principles and described clearly the details of the operation. According to him, the woman must be placed in the position for lithotomy upon a table, the vagina widely dilated with a speculum, the edges of the opening vivified with a knife or scissors, touching the bladder as little as possible, and united by strong pins of sharpened goosequills about whose ends thread was wound. How far successful this eminent Dutch surgeon was in his treatment we are in ignorance, as he left no record of his cases. This much, however, is certain: that he was the first to give an intelligent method of removing one of the most afflictive infirmities of the human race, and a method which contains many of the germs of the modern operation.

Mauriceau in 1712 looked upon the condition as incurable by operation. If recent, a cure was possible by introducing cicatrizing medicaments into the vagina and retaining a catheter in the bladder for several days.

Voelter in 1720, after freshening the edges, united them by interrupted silk sutures inserted by needles and needle-holder: the sutures were tied in a knot and a catheter used.

<sup>1</sup> Hendrik van Roonhuysen: *Heelkonstige Aauwmerkingen betreffende de gebreken der vrouwen*, Amsterdam, 1663.

Fatio in 1752, following the plan of Roonhuysen, succeeded in causing incontinence for a time.

Petit in 1790 confined his attention to the proper care and to the introduction of the catheter and use of a urinal. It will thus be seen that the eighteenth century passed without material change or progress in the treatment of these lesions from that in the time of Roonhuysen.

With the beginning of the present century began a new era of activity in the treatment of fistulæ.

Desault<sup>1</sup> in 1804 laid down two rules—to oppose the passage of urine into the vagina by introduction of a catheter in the urethra, and to approximate the edges by vaginal tamponing. Both methods had been previously used, but Desault so modified them to fulfil the conditions required that he may well be considered the originator. He used a large-sized catheter retained by a specially contrived truss-like apparatus. The vaginal tampon consisted of a rounded finger-like body of lint coated with wax and pressed into the vagina. With the slight modifications of the vaginal plug the method of Desault was generally approved and adopted by such men as Richter, Clarke,<sup>2</sup> Barnes,<sup>3</sup> Guthrie,<sup>4</sup> Blundell, and others. Soon, however, a violent reaction set in against this method, and the use of both the catheter and vaginal plug was severely criticised.

While this discussion was going on, Lewzinski in 1802 again proposed the interrupted suture, and in 1812, Naegele<sup>5</sup> tried to return to favor the ideas of Roonhuysen and his successors. He freshened the edges with a knife or scissors, and coapted them by means of interrupted thread sutures: he also used with silver or gilt pins a twisted suture. This practice was followed by Schreger<sup>6</sup> in 1817, who placed the patient upon the abdomen, scarified the edges with scissors, and united them with interrupted silk sutures; by Ehrmann, who made use of the dorsal position, trivalve speculum, scarification of the edges after the insertion of the interrupted suture, and the catheter: at times he also practised cauterization of the edges with a mineral acid. Deyber,<sup>7</sup> a contemporary of Ehrmann, indicates a new bivalve speculum calculated to depress the posterior wall of the vagina.

<sup>1</sup> P. J. Desault: *Traité des Maladies des Voies urinaires*, Paris, vol. iii.; Chopart: *Traité des Voies urinaires*, 1821, vol. i. p. 448.

<sup>2</sup> *Observations on those Diseases of Females which are Attended by Discharges, etc.*, London, 1821.

<sup>3</sup> *Med.-Chir. Trans.*, vol. vi.; *Gaz. des Hôp.*, 1837.

<sup>4</sup> *Edin. Med. and Surg. Journal*, 1818 and 1823.

<sup>5</sup> *Erfahrungen und Abhandlungen über Krankheiten des Weiblichen Geschlechts*, Mannheim, 1812.

<sup>6</sup> *Annal. des chirurg. Klinikum auf die Univ. zu Erlangen*, 1817.

<sup>7</sup> *Essai sur les Fistules urinaires-vaginales* (Inaug. Thesis), Strasburg, 1827.

In 1825 and 1827 a new method of treatment was introduced in France through the experiments of Lallemand,<sup>1</sup> Dupuytren, and Delpech. Lallemand<sup>2</sup> in 1825 applied nitrate of silver to the edges of the orifice, and when the eschar had separated brought them in apposition by means of a *sonde-erigne*: of 15 cases treated, 4 are reported cured. Dupuytren and Delpech used the actual cautery with modifications of the coapting instrument, and report a few cases as cured. The authors of this method of cauterization hoped to so modify the edges of the fistula by inducing inflammatory swelling that with the aid of mechanical approximation and contracting powers of the "inodular tissue" of Delpech they would succeed in closing, or, at the worst, in reducing the size of, the opening.

Owing to the severe attacks made by eminent surgeons, confidence was lost in this method, and it was largely abandoned. To show the confusion of ideas and practice at this time, the case of a woman may be cited who was successively treated by all the known methods by Morrison, Liston, Witther, and Syme.

Roux<sup>3</sup> of France in 1829 made use of the abdominal position and speculum, pared the edges, and united them with silver pins and the twisted suture.

Malagodi<sup>4</sup> of Bologna (1829), having failed with nitrate of silver, resorted to the method of suture and kept a catheter constantly in the bladder.

Dugès<sup>5</sup> of Montpellier in 1831 treated an unsuccessful case of Lallemand's by freshening the edges with curved seissors and a narrow bistoury and uniting them by curved needles and waxed thread. The threads were tied by a knot and a catheter introduced into the bladder. At the end of three days, owing to a severe hemorrhage, the sutures were removed, and the operation necessarily proved a failure.

Fabbri in 1830, modifying somewhat the plan of Malagodi, obtained a success. He also devised some instruments for freshening the edges and approximating them by suture.

In 1832, Vidal de Cassis<sup>6</sup> introduced a new method by closing the orifice of the vagina and making a common urinary receptacle of the vagina and bladder. He freshened the surfaces of the labia majora and united them by sutures to get complete union.

Gosset<sup>7</sup> of London in 1834 gave an account of a successful case

<sup>1</sup> *Arch. gén. de méd.*, 1825, vol. vii.

<sup>2</sup> Roche et Sanson: *Nouveaux Éléments de Pathologie médico-chirurgicale*, Brussels, 1829, vol. iv.; Deronbaix: *Traité des Fist. uro-gen. de la Femme*, Brussels, 1870, p. 40.

<sup>3</sup> *Journal hebdomadaire*, 1829, vol. iv.

<sup>4</sup> *Raccoglito medico*, July, 1829; *Arch. gén. de méd.*, vol. xxi.

<sup>5</sup> *Gaz. méd. de Paris*, 1831, Nos. 44 and 367.

<sup>6</sup> *Traité de Pathologie externe et de Médecine opératoire*, 5th ed., 1855, vol. v. p. 54.

<sup>7</sup> *Lancet*, Nov. 21, 1834.

treated by the following method: the patient was placed in the knee-elbow position, the perineum drawn up with a speculum, the edges of the fistula carefully pared, curved needles passed with a needle-holder, and the opening closed by uninterrupted sutures of gilded silver wire kept in place by twisting. An elastic catheter was kept in the bladder, and the patient requested to lie on the face to secure perfect drainage.

Beaumont in 1836, after paring the edges, united them with a quill.

Baroni of Bologna freshened the edges with the patient in the knee-elbow position, and united the edges by piercing the mucous surface of the vagina only with silver pins.

Gerdy<sup>1</sup> thought the failures of Baroni and of Rizzoli, who followed the same method, might be due to the small extent of denuded surface. He accordingly dissected a strip from the vaginal surface on each side of the fistula and united it by suture.

Dieffenbach<sup>2</sup> of Germany in 1836 practised several methods, but generally used that of the interrupted suture. He put the patient in the lithotomy position, exposed the fistula with a bivalve speculum, freshened the edges so as to assume a funnel-shaped appearance, and united them with interrupted silk sutures, being careful to avoid the mucous surface of the bladder. The catheter was worn constantly. In spite of the great surgical skill and ingenuity of the operator, his efforts were attended with poor success. On one woman he operated no less than eighteen times with failure, yet so great was his activity and perseverance that a large number sought relief at his hands.

In 1834, Jobert de Lamballe<sup>3</sup> introduced a new method of treating vesico-vaginal fistulæ which he styled elytoplasty or cystoplasty. It consisted in transplanting tissue taken from the labia, buttock, or thigh to the freshened edges of the fistula and fastening it there by stitches. The catheter was worn to ensure drainage. Of 4 cases reported, 1 was cured, 2 failed, and 1 died.

In 1838, Wützer<sup>4</sup> of Bonn practised the following method: the woman was placed upon the abdomen, the perineum drawn back by a hook speculum, and the labia separated by assistants. The edges of the fistula were then seized with a tenaculum and denuded for three or four lines, avoiding the mucous membrane of the bladder. The surfaces were approximated with insect needles and the twisted suture. Wützer adopted the original plan of opening the bladder above the pubes, introducing a catheter, and keeping the patient upon the abdomen to

<sup>1</sup> *Revue scientifique et industrielle*, June, 1841.

<sup>2</sup> *Die Operative Chirurgie*, Leipzig, 1845, vol. i.; Schuppert: *A Treatise on Vesico-vaginal Fistula*, 1866.

<sup>3</sup> *Traité de Chirurgie plastique*, 1849, vol. ii.

<sup>4</sup> *Ueber die Heilung der Blasenscheidenfisteln*, in *Organon für die gesammte Heilkunde*, Bonn, 1843, vol. ii.



ensure the constant escape of the urine. He was more fortunate in his operations than his contemporary, Dieffenbach. From 1838 to 1842 he, according to the testimony of Kilian, cured 4 out of 18 patients—a success which at that time may be considered extraordinary. Up to the year 1852 he had cured 11 out of 35 cases treated.

In 1839, Hayward<sup>1</sup> of Boston reported the cure of a vesico-vaginal fistula of fifteen years' standing which had proved intractable to cauterization and the catheter. The patient was placed in the lithotomy position, the parts dilated, and the fistula brought well into view by means of a large bougie pressing it down from the bladder. He then pared the border of the fistula and dissected from the vaginal surface the tissue to the extent of three lines. By means of curved needles three silk sutures were passed, the denuded surfaces brought into apposition, and the threads firmly knotted. A short silver catheter was placed in the bladder and the patient kept upon the right side. At the end of five days the parts were found united and the stitches removed. Although this method had been practised before in its essential features by Gerdy and Dieffenbach, yet, owing to their failures in effecting a cure, it had attracted but little attention. Hayward showed conclusively the success of the method, and inspired confidence in the curability of the affection. In 1851 an additional series of 8 cases were reported, making 3 cures after 20 operations.<sup>2</sup>

In 1846, Metzler<sup>3</sup> of Prague adopted the knee-elbow position and a polished silver speculum, grooved and somewhat conical, for raising the perineum and reflecting light upon the fistula. He freshened the edges with curved scissors, and extended the denudation for one and a half lines upon the vaginal surface. These surfaces were then united by gilded needles and clamps, and these secured by perforated balls the size of large shot. The catheter was kept in the bladder continuously.

In 1847, Pancoast<sup>4</sup> of Philadelphia succeeded in effecting two cures by a method he called his "plastic suture." The fistula was exposed by a Charrière speculum. The upper lip was split longitudinally for half an inch, and the lower one pared to a wedge-shaped form, drawn into the groove of the upper, and held by sutures. The bladder was drained by an elastic catheter.

In 1847, Mettauer<sup>5</sup> of Virginia published his account of a fistula treated with leaden sutures and catheter after paring the edges. Such was his success that he felt justified in pronouncing all cases of vesico-vaginal fistula as curable.

In 1847, Jobert de Lamballe adopted a second new procedure which

<sup>1</sup> *Am. Journ. Med. Sci.*, 1839.

<sup>2</sup> *Boston Med. and Surg. Journ.*, 1851.

<sup>3</sup> *Prager Vierteljahrschrift für prakt. Heilkunde*, 1846.

<sup>4</sup> *Med. Examiner*, May, 1847.

<sup>5</sup> *Am. Journ. Med. Sci.*, July, 1847.

he styled *cystoplastie par glissement*. The characteristic feature of this operation consisted in separating the vagina from the uterine neck, so that the fistula could be closed without tension upon the edges, and union thus favored.

Jobert de Lamballe was an exceedingly ingenious and skilful operator, and in the long line of surgeons who have sought to perfect a method of treating vesico-vaginal fistula no one excepting Sims has displayed more inventive fertility, depth of resource, and mechanical dexterity than this illustrious Frenchman. His method, which constitutes what is called the French method, was quite extensively practised by French and foreign surgeons, but is now almost entirely abandoned, because of the eminently superior results which have been attained by the American method, so called in distinction. This last method was presented to the medical profession by J. Marion Sims, then of Alabama, in 1852.<sup>1</sup>

The last half of the nineteenth century began, as we have seen, without any settled method in the treatment of fistula. On the part of eminent surgeons there was a sad lack of confidence in any procedure, a distrust, or even disparagement, of reported cases of cure, and a general belief in the incurability of these affections. To be sure, a few cases of successful treatment were reported from time to time, but they were received with indifference or excited but little attention. The method of Jobert, although the latest and attended in his own hands with some remarkable success, proved a failure for the most part in the hands of others, and consequently was not permanently adopted. All known methods by cauterization, vaginal tampon, coapting instruments, transplanting, and suture were practised by different operators or the same operator in the hope of obtaining a success. The weight of testimony, on the whole, was in favor of the method by suture. The contributions and successes of Gosset, Hayward, Metzler, and others provoked almost no interest, failed to be appreciated, and were barren of results. Such was the aspect of medical science toward urogenital fistulæ when J. Marion Sims made known the result of his experiments and observation and placed the operation for the radical cure of fistula upon a solid and certain basis, so that these lesions were removed from the category of incurables. Criticism was disarmed by success, and room left for no material improvement after leaving his hands in 1857. The discoveries to which Dr. Sims made claim were, first, a means by which the vagina could be thoroughly dilated and explored; second, a suture which could be left in place for a long time without exciting inflammation or ulceration; third, a method of draining the bladder of urine during the period of cure. These were accomplished by, first, the knee-chest position and the use of a speculum in form like that of a

<sup>1</sup> *Am. Journ. Med. Sci.*, Jan., 1852.

duckbill; second, the use of metallie threads secured by leaden elamps; and third, a self-retaining catheter. In 1857, Dr. Sims<sup>1</sup> had modified his operation by substituting the simple interrupted silver suture, secured by twisting, for the clamp suture, and by employing, instead of the knee-chest position, the less tedious semi-prone posture now universally known as "Sims' position."

As has been shown, not only were these essentials of success used previously by many operators, but all three were actually combined by two surgeons—Gosset of England in 1834, and twelve years later by Metzler of Germany. The former particularly described the advantages of the gilt-wire suture as an unirritating agent, and the latter emphasized the importance of thorough distension of the vagina by a speculum combined with position, and described a speculum in its essential features like that of Sims.

Though Dr. Sims was anticipated in the principles and details of the operation, it is unquestionably true, as shown by his writings, that he worked independently of others, and brought to the solution of this difficulty exceptional qualities of mind and great mechanical skill and ingenuity, which enabled him, in the face of almost insuperable obstacles, to carry forward his plan to its successful completion. To him belongs the credit of so combining and modifying operative procedures that they fully met the required conditions, and enabled the surgeon to undertake and promise a cure with gratifying certainty.

To simplify an operation which, with its difficulty and uncertainties, was once the *bête noir* of the most skilful surgeons, so that it is now within the capacity of ordinary operators, is a work whose value cannot be too highly estimated.

Bozeman of Alabama, initiated in the method of operating by Dr. Sims before the latter left the State, introduced in 1856 a device of his own which he called the "button suture." This consisted of a thin plate of lead made to fit the opening. Through perforations in the plate the wire sutures were made to pass, and were secured in place by perforated balls or buttons of lead compressed by strong forceps.<sup>2</sup> Bozeman, by his writings and by his skill and success as an operator, did much to popularize this method at home and abroad.

Almost contemporaneously with the promulgation of Sims' method Prof. Gustav Simon of Germany devised and announced an operative procedure for the cure of vesico-vaginal fistula which in point of success is second only to that of Sims. His first publication (1854) was chiefly concerned with a modification of Jobert's method. After comparing the French and American methods and studying their cause of

<sup>1</sup> "Silver Sutures in Surgery," *N. Y. Acad. of Med.*, 1857.

<sup>2</sup> "Remarks on Vesico-vaginal Fistule, with an Account of a New Mode of Suture and Several Successful Operations," *Louisville Review*, May, 1856.

failure and success, he gave his own plan of treatment in 1862. In most respects this is radically different from that of Sims, and those elements of success upon which Sims lays such stress he modifies or rejects altogether.

Simon's method was as follows: The patient was placed in the exaggerated lithotomy position, so that the vulva was well elevated; the fistula was thoroughly exposed by means of a duckbill speculum and retractors; the edges were pared, involving a portion of the mucous surface of the bladder; silk sutures were used to unite the edges, a double row, superficial and deep, being inserted if necessary. No catheter was employed, unless the patient was unable to pass the urine; the bowels were not confined; and the patient was allowed to sit up. Simon also devised a method for complete occlusion of the vagina below the seat of the fistulous opening, called *kolpokleisis*. The anterior and posterior surfaces of the vagina were denuded just below the fistula and united by sutures, thereby obtaining complete adhesion and closure of the canal.

Since the time of Sims' last contribution, in 1857, many modifications in the details of his operation have been made. Simpson's method of coapting the edges was by means of iron-thread sutures and a wire splint in place of the Bozeman "button." The splint was formed by twisting ten or fifteen fine wires into a cord, the ends of which were fastened together. This was then bent into a shape suitable for the fistula. Holes corresponding in number to the sutures are made by passing an awl between the strands. The iron-thread sutures were

FIG. 75.



Simpson's Splint in Place, wires fastened over the lower bar.

introduced by means of a hollow needle (a modification of Startin's needle); a crotchet and hook were then drawn through the perforations in the splint and twisted with a wire-twister, which was made after a plan suggested by Dr. Coghill. The permanent catheter was used.

I. Baker Brown very early adopted the American methods, and employed first Sims' clamp suture, and afterward Bozeman's button

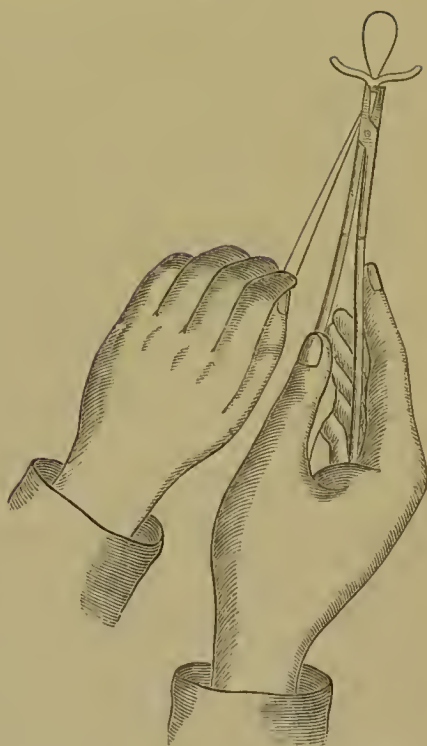


FIG. 76.



Coghill's Wire Suture.

FIG. 77.



Baker Brown's Method of Fastening Suture.

suture; later he made some modifications of his own. In 1859 he introduced the bar clamps to secure the wires. A separate clamp was placed upon each suture, and fastened by compressing the elevated centre or nipple through which the wire passed. He placed the patient in the lithotomy position, and used straight and angular knives for denudation, and hollow needles for introducing the metallic sutures.<sup>1</sup>

W. L. Atlee described an operation in 1860,<sup>2</sup> which was intended to combine the excellences of Bozeman's and Simpson's methods without their disadvantages. His sutures were of blue-iron wire. As each one was introduced, the end was attached to a thread line to prevent tangling. The edges were approximated before adjusting the plate by traction on the wires and twisting every alternate suture. The button was a lead plate with a long, narrow fenestrum bevelled toward the wound. On each side of the fenestrum was a row of perforations. The twisted ends were brought through the fenestrum and the others through the holes. The former were secured by compressed shot, and the latter by simple torsion with a Coghill twister.

Shortly after Atlee devised another means of coaptation. The edges were transfixed by blue-steel toilet-pins, and over the ends of each pin an elastic ring was slipped. Different-sized rings were obtained by cutting sections of rubber tubing of various diameters. If found

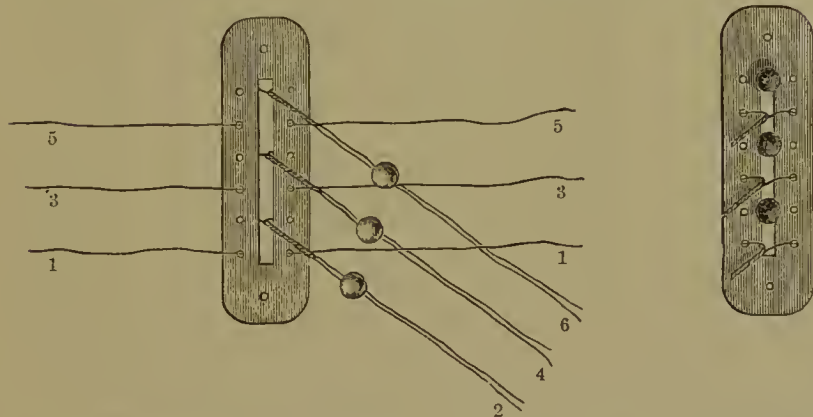
<sup>1</sup> Baker Brown: "On Vesico-vaginal Fistula, illustrating a New Mode of Operating," *London Lancet*, Feb., 1860, and *Surg. Dis. of Women*, 1866.

<sup>2</sup> Atlee: *Amer. Journ. Med. Sci.*, Jan., 1860.

necessary to guard the points of the pins, he recommended that perforated shot be compressed upon them.

In the same year Robert Battey<sup>1</sup> described a device for securing

FIG. 78.



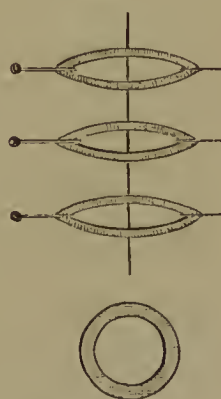
Showing Steps in Twisting Suture and Appearance when Completed (Atlee).

sutures, which he called the combined splint and compress. It consisted of a lead plate with perforations for the wires along the upper edge, and corresponding notches along the lower. As the sutures were introduced they were passed through the holes in the plate and fastened by perforated shot. The freshened edges were approximated by traction upon the lower ends of all the wires while they were supported underneath by a thin wooden spatula. Each wire was then lifted into its notch, twisted with the end previously shot, and cut off at the twist. The advantages claimed for this apparatus are support, compression without strangulation, perfect coaptation of the margins, and a water-tight joint.

Collis of Dublin described his operation in 1862 according to Agnew, though one of its salient features, division of the edges, was brought out in 1857 (Deroubaix). Dieffenbach, Hayward, and Pancoast had already employed a method similar to his to obtain a surface for union. Collis split the margins around the entire fistula, and turned each side back, the vaginal upon the vagina and the vesical upon the bladder. Double threads of silk were then drawn in. Through the row of loops along the superior edge a vulcanized quill was passed. The edges were then approximated, and the sutures secured by tying their free end to the other quill.

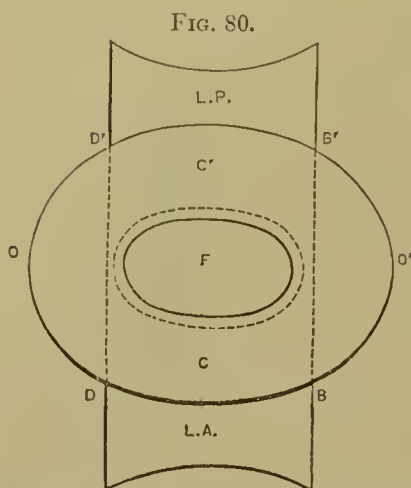
<sup>1</sup> Battey: "A New Principle of Treatment and Apparatus for Vesico-vaginal Fistula," *London Lancet*, Mar., 1860.

FIG. 79.



India-rubber Suture.

In 1864, Dr. Alfred Meadows<sup>1</sup> advocated before the Obstetrical Society of London the utility of dispensing with the catheter and allowing the patient to go about. He reported two successful cases in which he had employed this negative after-treatment.

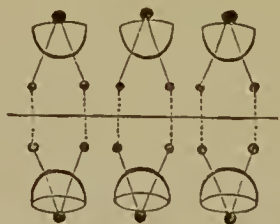


Shows the two flaps, L. A. and L. P., raised, and the two lateral surfaces, D O D' and B O' B', vivified (Deboué).

Deboué of Pau, recurring to the ideas of Hayward, Dieffenbach, Gerdy, and Collis, published in 1865<sup>2</sup> a new method by autoplasty or flaps. He dissected back a flap from the edge of the inferior and superior lips (or the right and left if the fistula ran longitudinally), and in large fistulæ denuded the vaginal surface at the angles of the opening. Metallic sutures were introduced. The

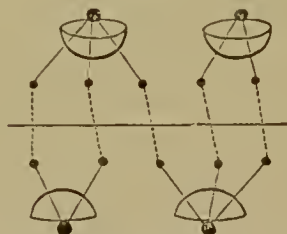
ends of the sutures on each side were passed through a small double-

FIG. 81.



Ends of Sutures secured, Two to a Button.

FIG. 82.



Method of Securing when there is an Odd Number of Sutures.

perforated hemispherical button, a pair of ends to a button, to which they were secured. There was, therefore, a row of buttons on each side of the line of union.

FIG. 83.



Section showing the Position of the Split Edges or Flaps when the Sutures are in Place.

<sup>1</sup> *London Lancet*, 1864.

<sup>2</sup> Deboué: *Mém. de la Soc. de Chir.*, 1865, vol. vi. p. 417; also Churchill, *Maladies des Femmes*, 1866, p. 920.

Courty was one of the first abroad, as Sims was the first here, to recognize the superfluity of such accessories as buttons, bars, clamps, quills, splints, etc., and to appreciate the entire adequacy of the simple interrupted metallic suture. The brilliancy of his results shows the wisdom of his conclusion. In 15 cases he had 15<sup>1</sup> cures. His method of operating closely resembles Sims' improved procedure, as set forth by the latter in 1857. He placed the patient in the lithotomy position and used iron-wire sutures, which he sometimes introduced by attaching them to a silk thread, and sometimes by a Startin needle in a holder devised for the purpose. Later, he used Chinese silk.

ETIOLOGY.—Among the rarest of fistulæ are those of congenital origin. Several cases have been recorded in which operative measures for their relief were attended with success.

The effective agencies in the production of fistulæ are all those of a penetrating or destructive character which result in a permanent opening through the wall of the utero-vulvar canal. These may directly penetrate the septum, as in wounds from the action of strong caustics, or indirectly do so in consequence of the pathological changes excited in the parts, the order of sequence being impaired circulation, inflammation, ulceration, and local death.

These agencies may be classed as pathological, mechanical, and traumatic in character.

*Pathological.*—It was formerly held, and by eminent surgeons, that the most common and important factor in the production of these affections was a diseased condition of the parts themselves. As late as the writings of Seanzoni we find this idea given expression to in the following terms: That he had oftenest observed vesico-vaginal fistulæ as the result of cancerous inflammations of the uterine neck, and that "perforations due to difficult labor only come second in point of frequency." Pathological fistulæ are now considered exceptional, and if they occur in connection with malignant growths more frequently than is generally supposed, the hopeless nature and gravity of the primary affections render the secondary of little interest and irremediable.

Fistulous openings may also arise from syphilitic and phagedenic ulceration or from affections seated in the vicinity of the vagina and bladder and accompanied by suppuration. The pus from such an abscess in making its escape may break through the wall of the vagina and bladder and establish an unnatural communication between this canal and neighboring structures, or, if a double perforation occurs, produce a urinary fistula. These abscesses may have their origin in the ischio-rectal fossa, broad ligament, in a perinterine hæmatocoele, and tumors of the abdominal cavity. These openings, however, differ from

<sup>1</sup> *Gaz. des Hôp.*, 1865, Nos. 122 and 123; Courty: *Traité pratique des Maladies de l'Utérus et de ses Annexes*, Paris, 1866.



the usual forms in showing a natural tendency to close on the cessation of the discharge. In case of double perforation the urinary is substituted for the purulent secretion, and the opening becomes permanent.

In certain exhaustive diseases accompanied with a greatly depressed vitality of the structures, as in the severe continued fevers, ulceration and perforation of the vesico-vaginal septum may take place. Moreover, a severe vaginitis in the puerperal state may take on a gangrenous character and end in extensive loss of tissue.

*Mechanical.*—Under this head come those agents which by their shape, position, or long-continued presence in the bladder, vagina, or vicinity excite inflammatory action and produce perforation. Of this nature are objects introduced into the bladder through the urethra; vesical calculi, the nucleus of which may have been some foreign body imprudently introduced; badly-fitting pessaries or pessaries too long retained and roughened by erosion and concretions, cases of which have been recorded by Breschet, Dupuytren, Lisfranc, Dieffenbach, Busch, and others. Sponges, tampons, and foreign bodies of all sorts used with an indefinite purpose are capable of producing ulceration, if not extensive loss of tissue, and complete perforation of the vesico-vaginal septum. Dupuytren reports the extremely difficult removal of a cup-and-ball pessary which had cut its way into both bladder and rectum. The remarkable feature of the case was the spontaneous cure of the two fistulæ following extraction of the pessary.

*Traumatic.*—These fistulæ result from wounding or compression of the genital canal. The rarer forms of direct injury to the vesico-vaginal septum are angular and pointed bodies in the bladder, a sound or catheter in rough and unskilled hands, wounds from firearms, vaginal lithotomy, puncturing of the bladder during vaginal operations for the relief of vaginal atresia, procidentia, and the like, and amputation of the neck or extirpation of the uterus for malignant disease. Foreign bodies introduced into the vagina for the criminal purpose of inducing abortion may by their violent manipulation result in fistula.

By far the most common and efficient factors in the causation of fistulæ are the circumstances and conditions connected with parturition. These are of such a nature as to cause either laceration or compression of the maternal structures and establish urinary fistulæ.

In a normal labor there is an equilibrium between the expelling and opposing forces; but if, for any reason, these relations are changed, and premature strong uterine contractions come on before the uterine neck is sufficiently dilated to allow of the passage of the head, a tear is likely to occur. Such lacerations in a lesser degree are common, but if extensive may involve the vesico-vaginal septum and give vent to the urinary excretion. Likewise, the natural resiliency of the tissues may be so impaired or lost that they will fail to dilate before the advancing part,

and a tear is the consequence. Such instances are seen in the rigidity of the soft parts in primiparæ of advanced age, or in contractions or morbid changes which have taken place in these tissues.

The conditions produced by laceration establish at once urinary and fecal fistulæ. The majority of fistulæ, however, are caused not by premature and rapid delivery associated with rigidity of the soft tissues, but from the severe or prolonged pressure of the presenting part. In difficult or delayed labors over 90 per cent. of the vesico-vaginal fistulæ are thus produced, according to Agnew,<sup>1</sup> and the statistics of Emmet<sup>2</sup> show, excluding the 23 fistulæ intentionally made in the operation of cystotomy for the cure of cystitis or removal of stone, a majority over all other causes of 95 per cent. The author's experience and the testimony of Sims and other writers are to the same effect.

While the head in its passage through the genital canal recedes in the intervals between the pains—that is, so long as the pressure is intermittent—little harm is done; but when the presenting part becomes impacted and the pressure continuous the maternal structures are in great danger. The resultant, on the one hand, of the opposing wall of the bony pelvis, and, on the other, of the advancing fetal head, is compression of the intervening tissues to such a degree that the circulation is cut off and the vitality of the part is impaired or destroyed. If, then, this pressure is severe, it need be of but short duration, or if prolonged of but moderate severity, to cause extensive loss of substance. Local death occurs, and when the slough separates a permanent opening is found in the adjacent viscus. In less severely contused portions of the septum it is probable that in consequence of the inflammatory and destructive processes excited perforation follows. Ordinarily, except in cases of laceration, the urine does not escape for several days after the delivery. This may be in four or five days, or the existence of such lesion may not be recognized for a month. Petit records such a case. Agnew reports one in which the opening did not occur until the twenty-first day after confinement; Adler of Iowa, one in which the slough had only partially separated after twenty-five days; Emmet gives the average of seventy cases, showing the separation of the slough to take place after the tenth day. The predisposing causes of the lesion are all those of a general or local character which delay or prevent the natural progress of the child. Such are contractions in the bony pelvis, a distended bladder (a condition especially emphasized by Emmet as a factor in the production of these affections), fecal accumulation, vesical calculi, vaginal tumors, rigidity or narrowness of the utero-vaginal canal, anterior obliquity of the uterus, hydrocephalus, monstrosities, malpositions, and the like.

<sup>1</sup> *Laceration of the Female Perineum and Vesico-vaginal Fistula*, 1873.

<sup>2</sup> *Principles and Practice of Gynecology*, 1884.

Bearing in mind the above statements, it follows that whether labor is of long or short duration the continuity of the vaginal wall is jeopardized whenever the pressure becomes continuous. Such conditions of imminent danger require and demand for their relief artificial assistance to the natural efforts, and of those aids the obstetrical forceps takes a front rank in value and efficiency. The use and abuse of forceps have furnished ground for many lengthy and sharp controversies among physicians and obstetrical writers, and the popular belief still holds instruments used in protracted and difficult labors as responsible for all the accidents that happen or disorders that ensue. The great weight of testimony, however, is to the effect that the obstetrical forceps is conservative in its action—that by its aid protracted labor may be terminated, and when timely used the liability to extensive sloughing and the establishment of fistulæ may be averted. In other words, sloughing and fistula of the maternal parts following protracted and difficult labors are more frequently attributable to delay in applying the obstetrical forceps than otherwise.

**ANATOMICAL CHARACTERS.**—As the large percentage of fistulæ have their origin in conditions connected with parturition, their location and variety will depend on the relation of the genital canal to the adjacent structures at the time of compression. It is largely the relative points at which pressure occurs that determine the seat of injury. As a rule, these lesions are found in the median line and at the most common seat of compression, behind the symphysis or in its immediate vicinity. In its natural position the bladder is situated just behind the symphysis, and is therefore most frequently exposed to injury during childbirth, giving rise to a fistula at the base of the bladder. When, however, the bladder is distended, it rises above the pubes, leaving the vesical neck and the urethra to receive the brunt of the advancing head, and resulting in a destruction of the septum at these points. Moreover, when traction is resorted to, and the bladder is already over-distended, laceration of the vesico-vaginal or recto-vaginal septum is especially liable to occur.

Lacerations and sloughing of the uterine neck and vaginal cul-de-sac, in consequence of the force exerted by the fœtal head at the superior strait, may produce a fistulous opening involving the uterus and bladder, or uterus, vagina, and bladder. If the laceration is deep, the reparative process may close the wound except a canal at the base, leaving a fistula directly communicating with the bladder and cervical canal—namely, a vesico-cervico-uterine fistula.

The ureter, in its normal position, cannot well communicate with the vagina as a direct result of injury during childbirth. In loss of tissue extensive enough to involve the ureter in the edge of the fistula, the ureter may communicate with the vagina, and later in the process of

healing become turned out upon the vaginal surface. This fistulous opening, according to Emmet,<sup>1</sup> is more commonly the result of cellulitis followed by an abscess. During this pathological process the ureter becomes drawn up to the level of the vagina and fastened there, its canal bent and the flow of urine partially obstructed. In time inflammation is excited, perforation follows, and the urine escapes into the vagina, generally in the cul-de-sac behind the cervix.

These urogenital openings vary much in contour. They may be round, oval, elliptical, angular, or linear. The usual form is the oval or elliptical—a shape given, according to Agnew, by the stronger contraction of the central longitudinal muscular fibres over those at the sides of the vagina and the circular fibres.

Fistulæ range from a size so small that they are found with great difficulty, and admit only the smallest probe to those which involve the entire septum. In the latter condition the wall of the bladder is apt to protrude through the opening and present a greatly inflamed and proliferated surface.

The complications that may be found associated with fistula are stricture or occlusion of the urethra, cicatricial bands or atresia of the vagina, and Simon met with a case in which inflammatory union had even taken place between the prolapsed vesical wall and the posterior vaginal wall. There is also the local inflammation excited by the continual escape of the aerid urine through an unnatural channel.

CLASSIFICATION.—In accordance with the above anatomical peculiarities, a plan first introduced by Jobert and followed generally by later gynecological writers, urinary fistulæ are grouped and given distinctive names, as follows:

#### *Urinary Fistulæ.*

Vesico-vaginal { At the trigonum vesicæ.  
                  { At the bas-fond.

FIG. 84.



Location of Various Forms of Fistulæ: 1, vesico-uterine fistula; 2, vesico-utero-vaginal fistula; 3, vesico-vaginal fistula; 4, urethro-vaginal fistula; 5, recto-vaginal fistula; 6, recto-labial fistula; 7, fistula in ano.

<sup>1</sup> *Op. cit.*, p. 847.



Urethro-vaginal.

Vesico-uterine { cervico-  
corporeo-

Vesico-utero-vaginal.

Uretero-vaginal.

Uretero-uterine.

**SYMPTOMS.**—In direct injury the presence of a fistula is indicated by the immediate and involuntary escape of the urine per vaginam. The usual symptoms, however, are those which follow difficult labor, accompanied with considerable bruising and gangrene of the soft parts. On the separation of the slough within three or four days to several weeks the urine escapes through the fistulous opening thus established. The urine, depending upon the nature and seat of the fistula, may flow constantly from the vagina or only at intervals. If the lesion is high up in the septum, above the ureters, the bladder will have retentive power while the body is erect. In fissure-like openings the edges may be sufficiently approximated, or in other conditions a fold of the vagina or the uterus may act as a plug to close the bladder. In urethro-vaginal fistulæ the urine is retained normally, but at the time of micturition the contents of the bladder may escape entirely by the fistula if large, or if small partly by the urethra and partly by the vagina. If but one ureter is involved in the lesion, this is constantly pouring its secretion into the vagina, while that from the other flows into the bladder and is passed naturally.

The more or less constant flow of an acrid, irritating excretion over a mucous and cutaneous surface not intended by nature for its conveyance results in inflammation and excoriation of these parts. The nates, thighs, and vulva are kept constantly wet, and become red, swollen, excoriated, and covered, it may be, with a vesicular or pustular eruption. Urinary concretions may form in the vagina, and a strong urinous odor emanates from the person, which excludes her from society and incapacitates her for participation in the ordinary pleasures and duties of life. Under such physical and mental strain it is not long before the general health suffers, grave disorders supervene, and the patient is condemned to a most miserable and pitiable existence.

As a rule, the capacity for conception is interfered with, and such women remain sterile, or, if they become pregnant, abortion or miscarriage is liable to occur. The characteristic symptoms are, in summary, the constant escape of the urine from the vagina; the effects of the wet condition and local irritation as shown by excoriations, vulvitis, vaginitis; and the highly offensive odor emitted by the clothing and person. Menstruation is frequently in abeyance as long as the fistula is present, but appears soon after cure of the abnormality.

**DIAGNOSIS.**—The above symptoms may leave no doubt in the mind

of the surgeon as to the presence of a fistula, but it can be certainly determined only by an exploration of the vagina itself. Sometimes, in long-standing cases of vesical catarrh with thickening of the walls and lessening of capacity, weakness or paralysis of the bladder may develop and the urine dribble away *per orificium urethræ*. Large fistulæ are generally detected by a simple digital examination with the patient upon the back, and their nature and extent made out, while small ones often tax the skill and ingenuity of the expert. In the latter case the sense of sight must be brought to the aid of touch.

The patient for examination should be placed in one of the following described positions: the first and most common in this country is upon the left side with the knees drawn up (Sims' position). A Sims speculum is introduced and the perineum drawn well back. The air, rushing in, dilates the vagina and allows the anterior wall to be inspected in a good light. The second position for examination which the author has found to serve as good a purpose is with the patient on her back in the manner described by Simon, and known as "Simon's position." A Simon speculum is introduced, by which the perineum is retracted and all of the anterior vaginal wall exposed to view. In either position the folds and hollow of the vagina may be more easily seen by the aid of tenacula, and a careful search will reveal the opening through which the urine escapes. If doubt exists, a probe may be made to pass through the opening into the bladder.

If the orifice is very minute, additional means must be resorted to. In these cases colored fluids should be injected into the bladder, and the point of their appearance upon the vaginal surface carefully noted. Milk or an infusion of cochineal or indigo will be sufficient to discover the seat of capillary perforations, whose course and extent may then be determined by the probe.

Should the bladder be in that extremely irritable condition when the injection of any fluid causes considerable pain, Bozeman's linen test may occasionally be found serviceable. The test is based upon the fact that mucus and pus spread *upon* linen, while urine instantly passes *through* it. That portion of the vagina where the urinary sinus is supposed to exist is wiped perfectly clean, and a piece of thin linen pressed quickly and smoothly upon it, at the same time close attention is paid to see where a spot of moisture appears.

Small openings at the upper part of the vaginal surface and suspected of ureteral connection are recognized by a thin probe taking the direction of the ureter, and from the fact that the colored fluid injected into the bladder does not make its exit by this opening; the closure of such a fistula gives rise to the violent symptoms of acute hydronephrosis.

At times it is extremely difficult to determine the location and character of a fistula, owing to the contraction of cicatricial tissue which

prevents the use of the speculum. In such cases a preliminary course of treatment must first be adopted for the removal of the stricture.

PROGNOSIS.—Within a comparatively recent date fistulæ incident to women were looked upon as beyond the resources of art. Reports of the proceedings of the Academy of Medicine of Paris (1838–45) show that eminent surgeons—Gerdy, Velpeau, Amussat, Berard, and others—had little confidence in any operative procedure then practised. Velpeau<sup>1</sup> questioned the success of published cures and doubted the advisability of operative measures. Jecanselme (1841) not only had no faith in the radical cure of these affections, but was suspicious of the veracity of those reporting such. Liston<sup>2</sup> asserted that an operation only made the patient worse, and added, “There is little hope in a case of any size.” Miller<sup>3</sup> advised palliative measures only. The above sketch is sufficient to show the light in which fistulæ were regarded by the majority of surgeons at that time. By the intervention of modern surgery the doleful outlook to both operator and patient has been reversed, and the affections are now regarded as susceptible of cure.

It has happened in quite a number of cases of recent origin that a spontaneous cure followed the separation of the slough, but under ordinary circumstances the lesion remains permanently open and requires radical treatment for its relief.

By virtue of the modern method presented by Dr. Sims in 1852 this opprobrium of surgery has been removed, and the prognosis made certain and positive in all cases accessible to treatment. Dr. Sims<sup>4</sup> in 1860 stated: “Of 261 cases of vaginal fistula (vesical and rectal), 216 have been permanently cured by the silver-wire suture, 36 are curable, and 9 incurable. Every case is curable when the operation is practicable, provided there is no constitutional vice to interfere with the powers of union. Success is the rule, failure the exception.” In a letter in 1864<sup>5</sup> he gives a record of having obtained 260 cures in 312 cases.

These statements have been fully confirmed by the experience of later operators. Emmet<sup>6</sup> gives the result of 171 cases of fistula met with in his practice as 149 cured, 11 improved, 4 not improved, 1 died, 6 result unknown. It is seen that only 2.33 per cent. of all the cases proved incurable. Of these, 2 were so from loss of tissue, another from a large exostosis behind the pubes, rendering an operation impracticable, and the fourth from the excessively fat condition of the patient. The 11 reported as simply improved were every one cured or could have been by subsequent operation. The single death resulted from advanced disease of the kidney.

TREATMENT.—This division of the subject deals more especially

<sup>1</sup> *Operative Surgery*, 1839.

<sup>3</sup> *Practice of Surgery*, 1852.

<sup>5</sup> *Thesis* of Monteros, Paris, 1864.

<sup>2</sup> *Practical Surgery*, 1846.

<sup>4</sup> Gardner's *Notes to Scanzoni*, p. 515.

<sup>6</sup> *Op. cit.*

with the methods of modifying the evils or obtaining a cure of urinary fistula; but it may not be out of place to speak briefly of preventive measures. By these it is not to be understood that such means are referred to as timely use of the obstetrical forceps or removal of irritating bodies, such as pessaries, calculi, etc., but proper attention to the conditions which have a disposition to terminate in fistulæ. Dr. Byford, who looks upon puerperal vaginitis as the chief cause of urinary fistulæ, is convinced, and lays stress upon the fact, that he has several times prevented the occurrence of fistulæ in such cases by allowing no pressure to come against the vesico-vaginal septum from any accumulation of urine in the bladder during the periods of inflammation and sloughing, and by seeking to reduce the latter as much as possible through the plentiful use of water by vaginal injection and by other appropriate remedies.

#### METHODS OF CURE.

- 1st. Application of means for obtaining spontaneous closure;
- 2d. Cauterization;
- 3d. Suture;
- 4th. Transplantation;
- 5th. Occlusion of the uterus or vagina;
- 6th. Methods adapted to special cases.

*Spontaneous Closure.*—Occasionally small fistulæ, and less frequently those of large size, become occluded without surgical interference. Possibly, these cases of spontaneous closure might occur oftener than they do if the measures advised for prevention of fistule—namely, copious douches of warm water and drainage of the bladder—were in each case carried out with scrupulous care and for a sufficient time to give Nature a chance: a strenuous effort must also be made to keep the body well nourished in order to promote the healing process.

M. Ed. F. Bouqué, in his elaborate brochure on *Treatment of Urogenital Fistules in Women by Secondary Union*, published in 1875, has collected sixty cases of spontaneous cure. The shortest time after which closure took place was five days, and the longest six and a half years.

Some curious histories and methods of management may be noted—among others, one reported by Prof. Raffaele at the congress at Florence in 1841.<sup>1</sup> The fistula was diminished in size by the use of caustics. “Pregnancy supervened and treatment was suspended; notwithstanding, the fistula healed spontaneously during gestation.” He advised the use of a bladder filled with air and introduced into the vagina, and believed that in this way he would imitate the pressure exerted upon the fistula by the gravid uterus.

Another case is cited by Corradi.<sup>2</sup> Eighteen months before the

<sup>1</sup> Bouqué: *op. cit.*, p. 72.

<sup>2</sup> J. Corradi: *Études cliniques sur les Rétrécissements de l'Urèthre*, etc., Florence, 1870.



patient had had a difficult and protracted labor, followed by a vesico-vaginal fistula, which for a year resisted all methods of treatment, even Sims' operation. Corradi had a button made of gold similar to Dupuytren's for ranula, and a forceps also similar to Dupuytren's for extraction of lachrymal canulæ, for the purpose of fixing the button in position. The latter was placed in the fistulous opening, so that one facette of the button was in the bladder and the other in the vagina. Micturition was immediately re-established, and not a single drop of urine passed any longer by the vagina. For five years the woman wore this button without experiencing any inconvenience; then by accident the button dropped out, and the urine still continued to pass entirely through the urethra. A few days after Corradi examined the patient, but found no fistula in the vagina.

Leishman<sup>1</sup> has related the case of a vesico-uterine fistula in which Nature brought about a cure in the same manner as Jobert had previously done by his ingenious procedure. There was spontaneous closure of the neck of the womb, so that the patient was completely relieved of her infirmity. Menstruation took place regularly through the bladder.

In some of these cases collected by Bouqué the permanent catheter and scrupulous attention to cleanliness were of great assistance in accomplishing a cure.

*Cauterization.*—Before the use of the suture was brought to its present state of perfection this was the favorite method of treating all forms of urinary fistulæ. The principal agents employed were nitrate of silver and the actual canterry. Others were also used, as sulphuric, nitric, nitro-muriatic, and chromic acids, caustic potash, caustic ammonia, tincture of cantharides, creasote, the red iron, and the galvanocautery.

At the present time, however, but little attention is devoted to this method, except from an historical point of view by those whom it may interest as having formed an epoch in the development of a cure for fistula, or because of its association with such names as Dupuytren, Delpech, and a few others of distinction.

As late as 1875 a monograph (previously mentioned) upon this method by Bouqué of Ghent appeared, in which he has collected the records of 109 cases cured by simple cauterization, and 35 cases to which uniting agents were applied after canterization. Of the latter, there were 25 cures, 6 failures, and 4 improved; of the 6 failures, 5 deaths.

It is only rarely and under special circumstances that this procedure is now considered proper. Lack of requisite skill or the necessary instruments for Sims' or Simon's operation would be the principal

<sup>1</sup> *Glasgow Med. Journ.*, Oct., 1861; Bouqué: *op. cit.*

reasons. It is also admissible in some cases of minute fistulæ, wire-holes, or the occasional small aperture caused from lack of union at some point.

The fistula, being brought to view by the introduction of a Sims speculum, is thoroughly touched by a pointed stick of nitrate of silver or the cautery. A tampon or glass plug—latter preferable—is then placed in the vagina in order to separate the vaginal walls and to support the vesico-vaginal septum during the process of granulation. A permanent catheter is used to prevent distension of the bladder and to hinder as far as possible the urine from passing through the fistule.

Cauterization is not to be repeated until the slough formed has fallen and the process of granulation and cicatrization has had an opportunity to accomplish what it can.

*Suture.*—Of the three modes of treatment by the suture now in general use, Simon's is the most popular in Germany, Sims' in England, France, and America, while Bozeman's has secured the favor of some in all, as has Simon's in other countries than his own.

*Preparatory Treatment.*—It cannot be urged too vehemently nor too persistently that in no class of cases is this so essential as before plastic operations about the vagina, especially for fistula. An anæmic and depraved condition of the constitution has many times caused a skilfully performed operation to prove a failure.

Preparatory treatment is both systemic and local.

Systemic treatment is carried out by means of chalybeates, bitter tonics, mineral acids, and, above all, by the most nourishing foods and those most easily assimilated; the latter are to be accompanied by digestants if the digestive organs are in an atonic condition, as they frequently are.

Massage and the galvanic or faradic current are also useful. Outdoor exercise, a sojourn in the country, or a water-trip, especially a sea-voyage, are important aids.

Local preparatory treatment has for its object to procure as nearly as possible a healthy condition of the edges of the fistula and surrounding parts, and to remove any obstacles to a complete view of the fistula. Sitz-baths, vaginal douches, and all that pertains to constant cleanliness are potent factors in the local preparation.

Emmet has directed attention to the harm of using about the patient napkins which have merely been dried without washing. The solids of the urine by this process become concentrated, and, adding their strength to the fresh urine, cause it to be all the more irritating.

Incrustations of urinary salts that may be found upon the edges of the fistula, in the vagina, or on the external parts should be removed by a stream of warm water, a soft sponge, and the dressing-forceps, and the seat of the sabulous deposit brushed over with a solution of

nitrate of silver, which is to be reapplied every fifth day till the excoriated surfaces are healed. The parts are to be constantly protected by anointing them with vaseline or ointment of oxide of zinc. The care given to the edges if inflamed and thickened can neither be too great nor too solicitous, since upon their good condition depends much of the success of the operation.

In times past, when copious douches of hot or tepid water were not so generally recommended in the majority of affections of the genital organs, the following conditions were frequently observed in patients suffering from fistula: extensive incrustations, abscesses, excoriations, reaching even down upon the thighs; the anterior wall of the bladder protruding through the fistula and covered with phosphatic deposits, which prevented the patient walking except by enduring the most excruciating pain; and when all were combined, as occasionally happened, the woman presented a most lamentable spectacle.

If the vaginal canal is narrowed at any point by cicatricial bands, they are to be severed. Often a band will extend across the vagina just below the fistula, thus partially or wholly obstructing the view and presenting difficulties to the introduction of sutures.

Placing the patient on the back, the operator introduces two fingers into the rectum and the thumb into the vagina for guidance and counter-pressure, and cuts with blunt scissors any constricting bands which are found by compression of the thumb.

Scissors are preferred to the knife, as there is less hemorrhage, and cicatricial tissue thus divided heals more slowly, thereby allowing greater time for absorption to be produced by pressure. This pressure is exerted by means of a Sims glass plug, which is introduced immediately after the operation of severing the constricting bands. The plug is retained by a T-bandage, and the patient placed in bed, where she should remain about ten days. When deemed proper, after twenty-four or thirty-six hours, remove the plug and inject a large amount of warm carbolized water into the canal once a day, or oftener if there is a profuse discharge. The plug is then to be reinserted, and worn as many hours each day as the patient can tolerate until the incisions have healed. If at the end of this time the canal is not sufficiently widened, the process must be repeated.

*Sims' Operation.*—The table to be used will be found most convenient if its dimensions are about five by two and a half feet. It is covered with a folded blanket and at the lower end with a rubber cloth. The patient, protected by drawers, night-dress, stockings, and a sheet, is placed in the semi-prone or Sims' position, as it is frequently called; that is, upon the side, usually the left, with the under arm drawn backward, so that the breast rests upon the table, the upper thigh flexed at a right angle with the body, and the lower thigh a little less so; a hard

enshion placed under the hips, by which they are elevated, will facilitate the view of fistulæ in some situations.

The number of assistants is four—namely, one to administer the anæsthetic; a second, to hold the speculum and lift up the nates; a third, to sponge and wash the sponges; and a fourth, to hand the instruments. If only three assistants can be obtained, the instruments may be laid out within reach of the operator, thus dispensing with a fourth assistant. The instruments should be arranged upon a table conveniently near and with reference to the order of the operation. Plenty of needles, curved and straight, of various sizes, and threaded with silk loops half knotted at the eye, should be stuck through a piece of chamois-skin, or, better still, into a sheet of cork, near at hand.

The necessary instruments are—a Sims speculum; a long-handled knife with a narrow blade; long-handled right- and left-curved scissors; tooth-forceps; several tenacula; blunt hook; Sims' fork and fulcrum; Sims' or Emmet's wire-twister and needle-holder; needles; fine silk, of which No. 1, 2, or 3, braided, is as reliable as any; silver wire No. 29—a size coarser or finer is sometimes required; Sims' sponge-holders and several small sponges.

The steps of the operation are three:

1st, vivifying the margins of the fistula;

2d, introducing the sutures;

3d, coapting the edges and fastening the sutures.

*Vivifying the Margins.*—It is essential that the borders should be drawn together in the direction of the least traction. This point must be borne in mind at the outset, since in many cases it governs the shape and directions of the denudation.

The highest or least accessible portion of the fistula is caught up by a tenaculum or tooth-forceps and pared by a knife, or preferably by scissors. If the strip can be removed in one entire piece, it is advisable, as then there is a certainty that the edges are perfectly freshened.

The mucous membrane of the bladder should be carefully avoided in the cutting or there is liable to be troublesome hemorrhage. The denudation consists in bevelling of the borders at the expense of the vaginal surface. The latter is considerably encroached upon if the edges are thin, in order to procure a broad surface for union.

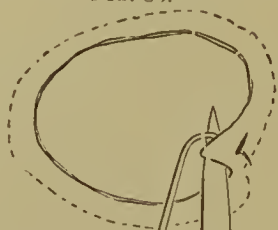
Another method of obtaining sufficient surface when the edges are thin is to split them and spread them open, so that when the fistula is brought together the two surfaces of one edge lie upon the two opposing surfaces of the other. Still another plan is to split one edge and bevel both sides of the other, so that when approximated one fits into the other. But sufficient width can always be obtained by the first method, which has the advantage of being most easily performed.



If the first strip removed does not give breadth enough, pare another just outside of the first.

Each end of the opening must terminate in an acute angle, which is

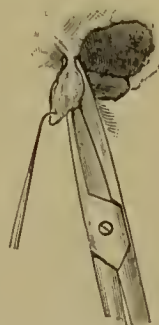
FIG. 85.



to be formed by the operator, if it does not already exist, by extending the denudation into a long point on the vaginal surface. If proper attention is not given to the shaping of these angles, there will be a puckering of the tissues which will result in a small orifice remaining at one or both ends of the line of union after the rest of the fistula has healed.

Hemorrhage can usually be check-

FIG. 86.



Method of Paring the Edges (with scissors)  
(Savage).

ed by a stream of hot water, but if not by pressure or ligation. Pressure can be exerted by pushing the centre of a piece of thin cloth through the fistule; then, while the ends are held, cotton is packed into the sac thus formed on the vesical side. Suf-

FIG. 87.



Bevelling of the Edges: A, vaginal surface; B, vesical; c c, lines of paring.

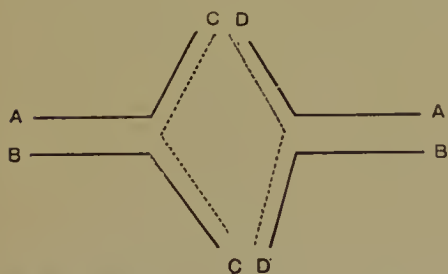
Paring the Edges (with knife).

ficient pressure can then be brought to bear upon the bleeding surfaces by traction on the ends held in the hand. Emmet has found the following

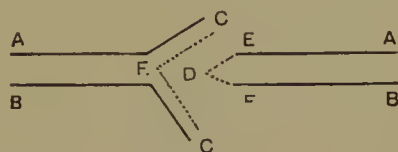
means of compression useful: A suture is "passed from the vagina through the septum into the bladder, on the finger as a guide, then across to some distance on the other side, and out into the vagina again. In this way the bleeding vessel, which comes from the neck of the uterus or from the neck of the bladder, is ligated, as it were, in the fold of tissue, and the bleeding arrested. One precaution, however, must be taken to avoid including the ureters; and this is done by passing the sutures at a less distance than half an inch on either side from the median line."<sup>1</sup>

In a case<sup>2</sup> of severe hemorrhage from severing the vesico-vaginal artery Simon ligated the artery with fine Chinese silk and brought the ends of the ligature out between two sutures into the vagina. The silk was removed on the fifth day, and no evil results followed from the presence of the ligature between the lips of the wound.

FIG. 88.



Second Method: A A, vaginal surface; B B, vesical surface; C C and D D, inner surfaces of split edges, and the ones to be coapted.



Third Method: C F C and E D E are to be coapted.

If the mucosa of the bladder should, by accident or otherwise, be included in the denudation, the hemorrhage into the bladder may be so profuse as to necessitate removing the stitches. Shortly before his death Dr. Peaslee lost a patient from this cause.<sup>3</sup>

*Placing the Sutures.*—The needles to be used are slightly curved and one-half to three-quarters of an inch in length. Some prefer a straight needle. Those used by Sims were round with a cutting point. Agnew's needle is spear-shaped, with a countersunk eye, and is more of a cutting needle than that of Sims. As it is important that hemorrhage should be avoided as much as possible, a needle that simply displaces the tissues has been found most desirable; of this sort is Emmet's, which is slightly curved, smooth, round or somewhat flattened in one direction at the eye, and in the opposite at the point, and a countersunk eye. The changing diameter is favorable to displacement.

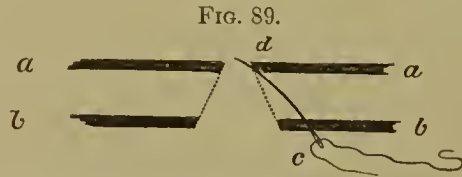
After the sutures are cut the desired length, eight or ten inches, the ends are bent over by a knife and pinched down by a pair of forceps,

<sup>1</sup> Emmet: *Prin. and Prac. of Gyn.*, p. 825, 1884.

<sup>2</sup> Simon: *Mittheil. aus der Chir.-Klin.*, 1861-65, i. Abtheil, S. 179.

<sup>3</sup> Emmet: *op. cit.*, p. 825.

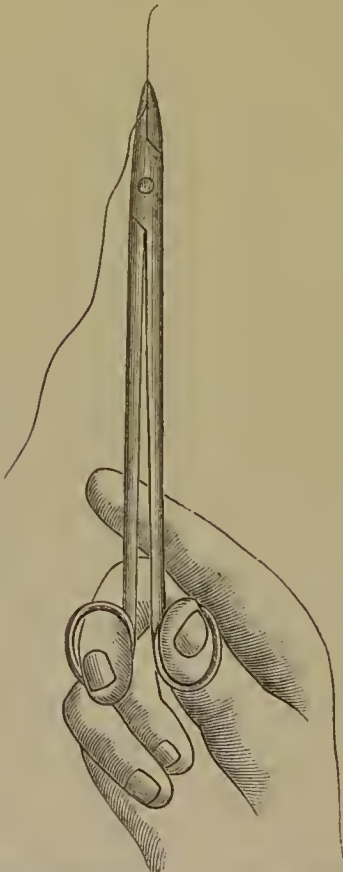
in order that the loop may be as small as possible. The surgeon must also see that there are no kinks in the wire before it is introduced, as well as prevent them while placing it. The silk used to draw in the



Direction taken by the Needle: *a*, vesical margin; *b*, vaginal margin; *c*, point of entrance of needle; *d*, point of exit of needle.

wire should be as fine as will be safe from breaking; No. 1, 2, or 3, braided or some variety of twisted silk of the same size, is usually employed. Each needle is to be threaded with a loop which is half

FIG. 90.



Sims' Needle-holder, with Needle (Sims).

FIG. 91.



Emmet's Needle-holder.

knotted at the eye. The loop end should be several inches long, that the wire may be easily hooked into it after it is drawn partly through the edge of the fistula.

The farthest or least accessible portion of the edge is now caught up by a tenaculum, and the needle inserted behind it in such a manner that the needle will pass in at some distance from the margin on the vaginal side, and come out near the meeting-line of the denuded surface and the vesical mucous membrane, and thus avoid puncturing the latter. Piercing the mucous membrane of the bladder may result in hemorrhage into the bladder sufficient to cause vesical tenesmus; but the most serious objection is that the needle-holes may remain as small fistules.

As soon as the point at which the needle will pass out is seen, counter-pressure is made by a blunt hook to aid its passage and prevent straining the tissues.

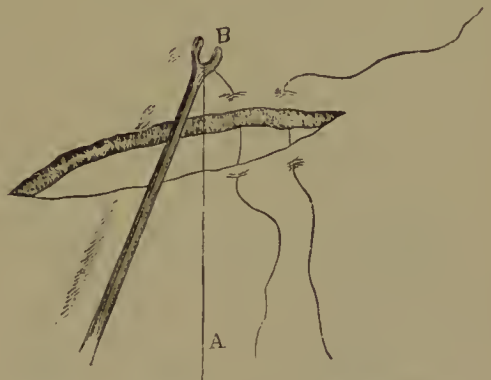
After the needle is pushed through as far as the end of the needle-holder will allow, the point is seized and the needle drawn through, while counter-pressure is still maintained. The silver is then hooked into the loop, and, after a Sims fork has been placed under the thread where it emerges to support the suture and obviate the risk of tearing the delicate edges, the silk loop is drawn through, followed by the sil-

FIG. 92.



Applying Counter-pressure (Emmet).

FIG. 93



Supporting the Sutures by the Fork (Emmet).

ver. The ends of the wire are then lightly twisted together, and held back out of the way by the assistant who holds the speculum, or the suture may be nearly drawn through, the long end passed through the loop on the short end, brought back, and tucked under the speculum.

All the threads may be passed first, then all the wires drawn in; but the former are apt to become tangled and weakened by being saturated with blood and urine, so that it is advisable to introduce the silver after each silk thread. Plenty of tissue should be taken up by the stitches, which are to be from one-fifth to one-fourth of an inch apart. The exit and entrance of each suture should be as nearly opposite each other as possible, but so fine a surgeon as Emmet declares that even an experi-



enced operator may not always obtain the great accuracy in this respect which authors formerly insisted upon, but that with a reasonable amount of care on this point and a proper shouldering of the wires, so that the twist is in the right place, the desired result will usually be obtained—namely, union by first intention.

*Securing the Sutures.*—The wires are now grasped by the operator and the edges of the fistula approximated. Each suture is then shouldered; that is, the wires along both sides of the wound are each bent to a right angle over a tenaculum, the point of the angle being just far enough from the needle-hole to be in the plane of the denudation when both ends are drawn up tight. As each suture is shouldered it is next seized by the twister, the operator being sure that both ends are caught—otherwise one wire may be twisted off—and a Sims shield is placed over the wires to support them and cause the twisting point to be imme-



FIG. 94.

Shouldering Sutures.

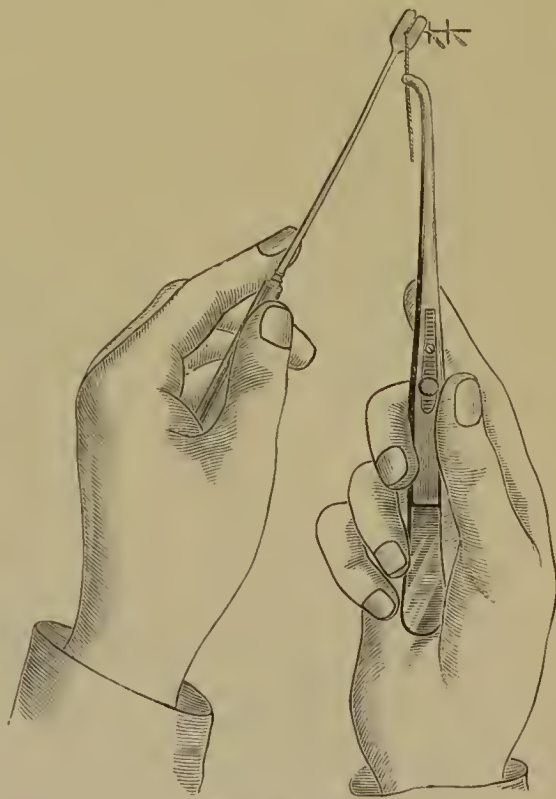


FIG. 95.

Twisting the Sutures.

diately over the line of union. The wires are twisted tightly enough to coapt the edges exactly and firmly, but with care to avoid strangulation.

The operator now inspects the line of union to see that no portions

of the denuded surface are everted, for in such an event they would fail to unite by first intention, and thus leave a granulating surface; or, on the other hand, that there are no points of vaginal mucous membrane inverted to prevent union.

FIG. 96.



Sims' Shield or Fulerum.

Any inaccuracies of this sort can easily be corrected by the use of two tenacula. The last item, though small in itself, has often much to do

FIG. 97.



Enmet's Twisting Tongs.

with the smoothness and regularity of the line of union on the vaginal surface.

The sutures are clipped off about half an inch from the surface, and bent over a tenaculum flat upon the vagina and alternately turned on one side and the other.

A Sims or Skene-Goodman self-retaining catheter is introduced, and

FIG. 98.



Sims' Sigmoid Catheter, self-retaining.

FIG. 99.



Sims' Self-retaining Catheter, new style.

FIG. 100.



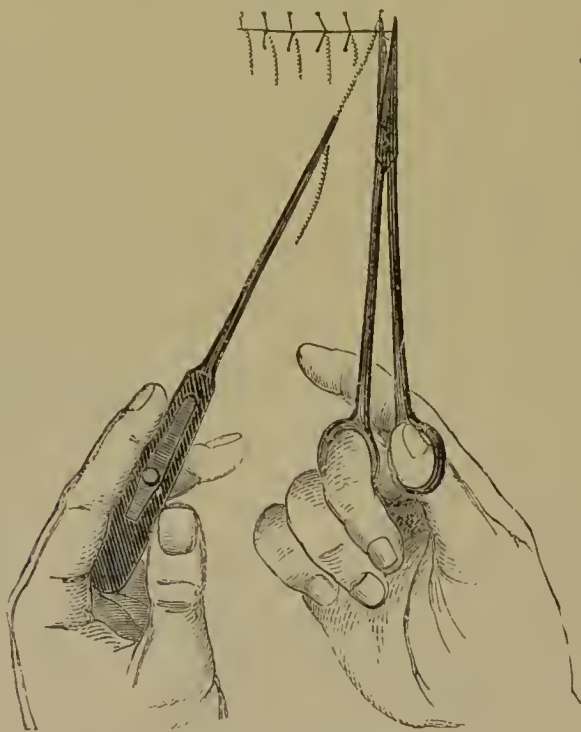
Skene's Modification of Goodman's Self-retaining Catheter (Skene).

if there is evidence of much blood having escaped into the bladder, the latter must be washed out or the clots formed may give rise to vesical tenesmus. The catheter must be carefully watched by the nurse, to see that it does not become clogged. It should be removed at least every twenty-four hours, or oftener if necessary, cleansed with a brush, soap, and carbolized water, and immediately reinserted; or, what is better, have two catheters, which are used alternately.

The urine can be received in a dish from the rubber tubing fastened to the end of the catheter, or the dish may be placed immediately under the end of the catheter, which projects a little way beyond the vulva. The patient should be given a warm vaginal douche once a day. The bowels are kept constipated with opium until thirty-six hours before removal of the stitches, when a laxative is administered. Near the time at which a movement is expected an injection of six ounces of warm olive oil is sometimes given, as it softens the rectal accumulation and facilitates its passage. An enema of warm water may also be necessary.

The sutures are to be removed in from seven to fourteen days; Sims considered the eighth day the proper time. Colored fluid may be injected into the bladder before the stitches are taken out, and if there is leakage it is sometimes of avail to leave them in a few days longer.

FIG. 101.



Removal of Silver Sutures.

Dr. Schnuppert<sup>1</sup> reported two cases in which leakage of injected fluid occurred on the sixth and seventh days, but there was perfect retention on the twelfth, when the stitches were removed.

To remove the sutures, hook up each one with a tenaculum, cut the wire with scissors, and then with a pair of dressing-forceps pull it out.

<sup>1</sup> *Vesico-vaginal Fistula*, 1866.

Wire-scissors have been devised which have hooked points for the purpose of catching up the wire and cutting it also. The operator has simply to seize the twist with a pair of forceps, and while making slight traction he places one hooked point under the wire, severs it, and draws it out. If the sutures are not imbedded, the latter plan is easier and more expeditious, and a tenaculum need not be used.

Immediately upon removing the sutures, or perhaps not before a lapse of several days, the operator may find that success has not attended his efforts, but at least the fistula will have been made smaller, and usually can be perfectly closed by another operation. There are, however, occasional cases which require several operations before a cure is accomplished.

*Simon's Operation.*—The principles upon which this operator bases his method of treatment of vesico-vaginal fistula differ quite markedly from Sims', with whom he was a contemporary worker. The measure of success which has attended this mode and the popularity which it has obtained in Germany entitle it to a place next to, or even on the same level with, that of Sims.

The distinctive features of Simon's operation are—

1st. He places the patient upon the back in an exaggerated lithotomy position.

2d. He intentionally incises the vesical mucous membrane if the edges contain much cicatricial tissue.

3d. He denies the superiority of silver over silk, and even prefers the latter.

4th. He employs no permanent catheter, and allows the patient to urinate as soon as she is able and whenever she has a desire to do so.

5th. The after-treatment is negative.

In 1862, Simon fully described his method, with its advantages, in his work on *The Operation for Vesico-vaginal Fistula*. He called the posture used for his operation the breech-back (Steiss-Rückenlage), to distinguish it from the ordinary dorsal position, and because the most projecting part is the breech, which presents itself in a manner very similar to that of breech presentation. The hips are elevated somewhat above the level of the abdomen of the patient, so that the trunk is in a position very like the knee-elbow. If the fistula is situated high in the vagina, the hips must be considerably elevated and the thighs drawn upward and backward as far as possible. If, on the contrary, the fistula is seated in the lower part of the vagina, less elevation of the hips and less flexion of the thighs are required.

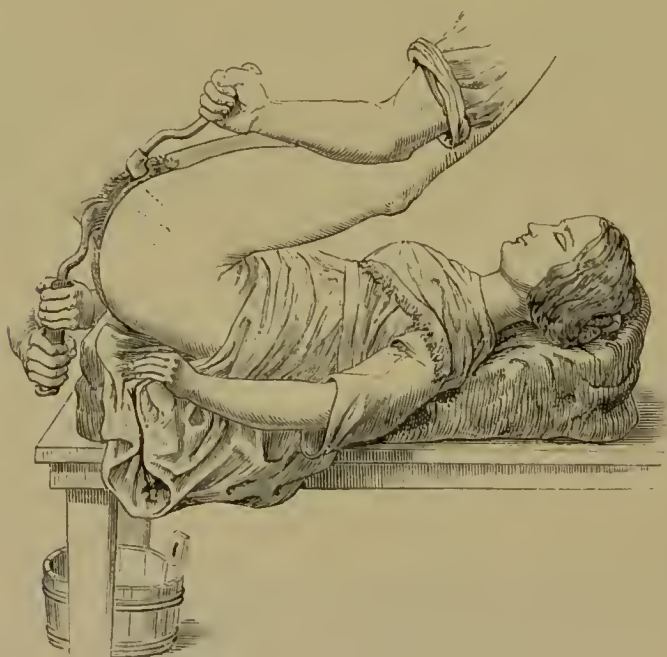
Whenever it is possible the fistula is drawn down near the introitus vaginae, on account of the light and greater convenience of the operator. To do this slow and gentle traction is made upon the cervix by seizing it with a Museux forceps. If found to be movable, two threads



are passed through the cervical lips, and by them the neck and the part to be operated upon are maintained in the desired position. In the majority of cases, however, the above procedure will be impossible, and instruments for otherwise exposing the fistula will be needed.

These are four in number—viz. a perineal retractor, an anterior speculum, and two side levers. The perineal retractor is a blade similar to that of Sims' speculum fixed by means of a spring into a handle, but has two additional large sizes. The anterior speculum is flat, and is fas-

FIG. 102.



Simon's Position for Vesico-vaginal Fistula (Simon).

tened by a catch into a handle. There are several sizes, which also vary in their proportionate length and width. The side levers are of two shapes—those bent at a right angle and those at an obtuse angle. The anterior speculum holds up the anterior wall, and the side levers press back the lateral portions of the vagina and the labia.

Any cord-like constrictions are to be cut; Simon has even severed vaginal folds which offered obstruction.

*Vivifying the Edges.*—Simon does not seek to obtain a sufficient surface for union at the expense of the vagina alone, but gives preference to a deep funnel-shaped incision, including all the tissues down to the vesical mucous membrane, or even through it. Cicatricial tissue must be removed as far as possible in order to get union by first intention, and to do this he did not hesitate to pare the edges freely, even if a fistula large already were made still larger. His defence of this free

incising is that union is more apt to take place, and even if it has to be repeated, it does not cause the patient to lose any more urine. In general, he places but little importance on avoiding incision of the

FIG. 103.



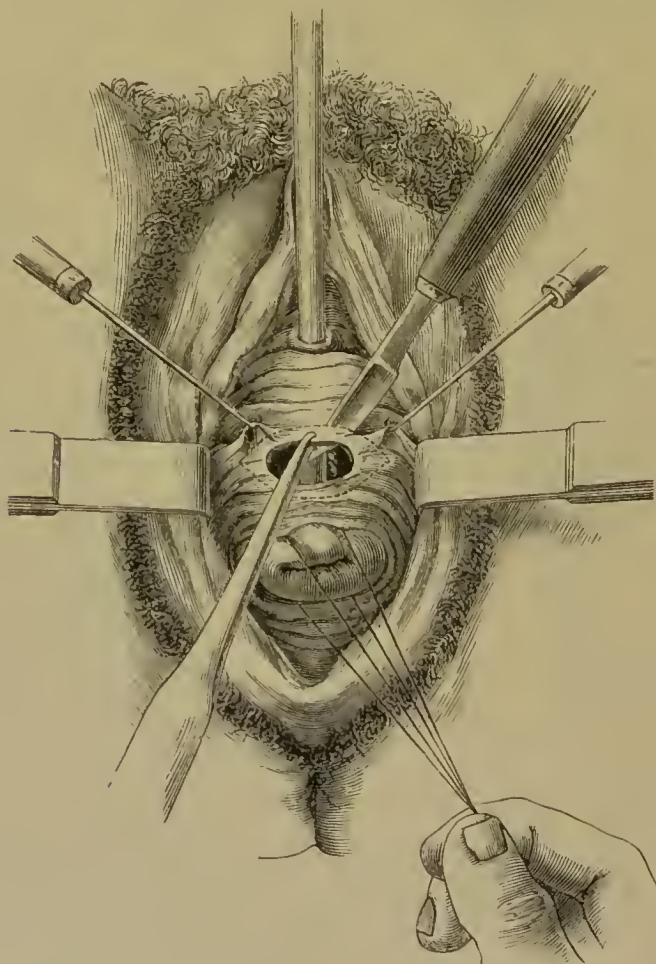
Simon's Specula : blades of various shapes and sizes.

bladder. Several advantages are claimed for the shape and depth of his vivification, which are principally based upon two points—that union does not readily take place between cicatricial tissues, and that it is more sure to occur if the tissues join each other in the same plane in which they naturally lie. The former point he is tenacious about. The deep funnel-shaped incision removes all cicatricial substance. The steep-bevelled edges are more conducive to union than the flat-bevelled, since in the former the nerves, vessels, etc. are continued in their natural direction. An unnecessary amount of denudation is made in the latter form, as only the upper edges unite in any case. When the margins are bevelled flat, they are made thin, which is a great drawback if the first operation is a failure and a second freshening is required. He considers that catarrh is not a more probable sequence of this method than of the other.

*Method of Uniting the Edges.*—In 1854, Simon published his method

of uniting the edges, which, in a modified form, has been the one employed ever since. Coaptation of the margins is accomplished by a single series of sutures in small fistulæ, and by his double suture (*Entspannungs und Vereinigungs-Näthe*) in the large ones. The "relaxing" sutures are introduced very deep, passing either near to or through the vesical mucous membrane, according to the size of the

FIG. 104.



Incising the Edges of the Fistula, immediate access (Simon).

fistula, and are placed at a considerable distance from the edge. This causes the tissues upon either side of the fistula to approach each other, and thus produce a relaxation at the line of union.

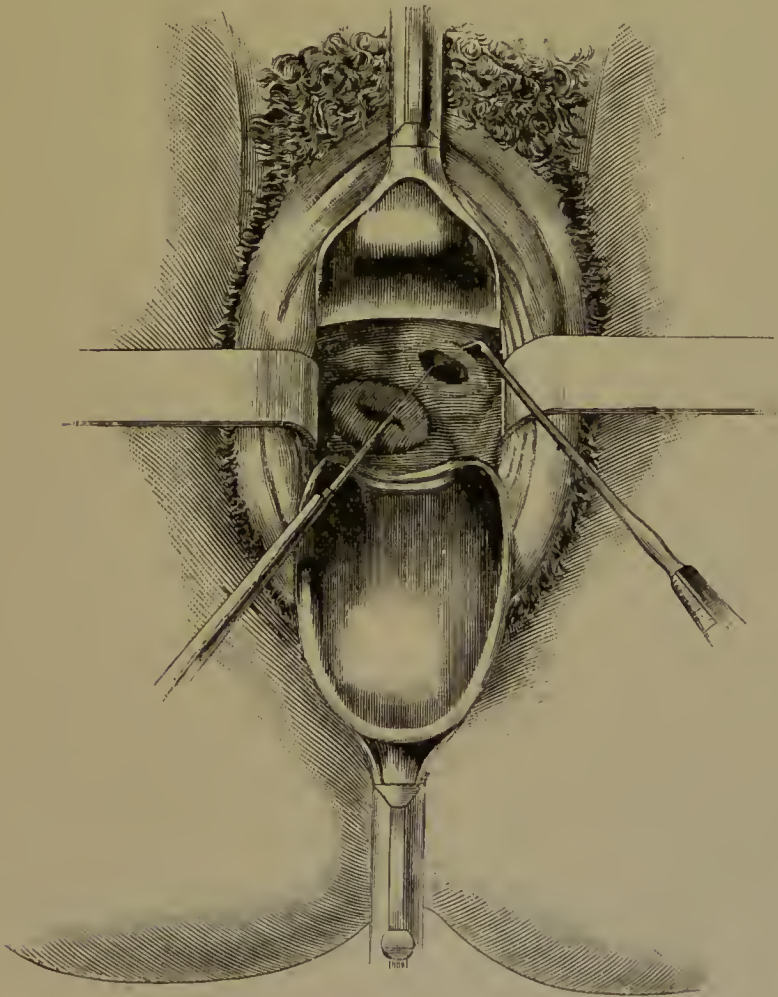
The "uniting" sutures are introduced quite near the edge, and always pass below the vesical mucous membrane. The stitches of this series alternate with those of the other, and the two rows are complementary in their action. Simon considers it of very little importance whether the vesical mucous membrane is penetrated or not,

but care is taken that it is not inverted so as to be included between the lips of the wound.

The sutures used are of fine silk, and are placed from one to one and a half lines apart.

*After-treatment.*—From a series of observations upon two important points, Simon came to conclusions which are quite opposed to those formerly held, and also to those now entertained by the majority of surgeons who operate according to American methods. These are—

FIG. 105.



Incising the Edges of the Fistula, mediate access (Simon).

1st. That the urine has no deleterious effect, either upon the wound or the new scar, and neither prevents union by first intention nor breaks up a cicatrix when once formed.

2d. That if the edges have been thoroughly vivified and properly united, no harm will follow from the degree of distension resulting

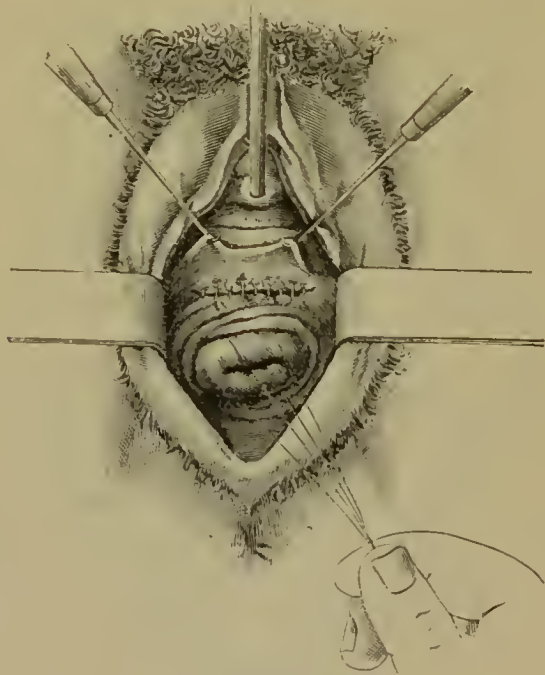


from a normal filling of the bladder; and a stationary catheter has injurious effects.

In 1860 he announced his "negative after-treatment as a thoroughly rational method, and in 1862 as the only rational one."<sup>1</sup>

The patient takes any position in bed which she prefers. The permanent catheter is dispensed with, and she passes water naturally whenever she feels a desire to do so, lying upon a bedpan, or, if that is objectionable, getting upon the hands and knees or sitting up. Where there is inability on the part of the patient to evacuate the bladder, as

FIG. 106.



Sutures Tied (Simon).

sometimes happens in the first twenty-four hours, the urine is drawn at proper intervals.

Patients are allowed to eat whatever they like.

The regular movements of the bowels are not artificially hindered, and it is recommended that they be kept loose in order that there may be no straining. A daily vaginal douche is used, but the bladder is not washed out. Should there be any vesical tenesmus, it is relieved by eight-grain doses of morphia.

The sutures are removed on the fourth or fifth day if the fistula can be reached with ease; in difficult cases they may remain till the sixth or seventh day. Simon asserts that they have stayed several weeks

<sup>1</sup> Simon: "Historical Remarks on Operative Occlusion of the Vagina, etc.," *Deutsche Klinik*, No. 45, 1868; *Am. Journ. Obstet.*, Aug., 1869.

when it had happened that the stitches had been cut off just in front of the knots and had become imbedded in the tissues; and this with no more harm than with silver sutures.

On the eighth day the patients are permitted to leave the bed, even if the stitches are not yet all out, and in some favorable cases they have been allowed to rise after the first twenty-four hours, and in two or three days even to take out-door exercise.

Simon reports the following results: By his old method (before 1859), "of 22 fistules in 22 patients, there were cured completely 14 fistulæ in 14 patients. 5 fistulæ in 5 patients closed up to small fistulous openings. Of these, 1 patient was afterward cured entirely by kolpokleisis; another has placed herself under my care. 1 patient with 1 fistule was discharged as incurable (is now again under my treatment). 2 patients with 2 fistulæ died."

By his improved method he reports: "Of 96 fistulæ which occurred in 83 patients, 89 fistulæ, equal to  $92\frac{2}{3}$  per cent. (77 patients), were cured, and only 4 patients, equal to  $4\frac{1}{3}$  percent., died."

The total results of these two series are as follows: "Of 118 fistulæ occurring in 105 patients, there were 104 fistulæ in 92 patients cured completely (a later cure is counted under the first category); 5 fistulæ in 5 patients almost entirely closed; 2 patients with 3 fistulæ discharged as incurable; 6 patients died."<sup>1</sup>

Contemporary workers in the same field, Sims and Simon, both gained the object for which they labored, but each in his own way, and each independent of the acts and aims of the other. The achievements of our own countryman have been so brilliant that our eyes have sometimes been blinded to the scarcely less shining example of success which Simon has shown.

Although it is incomprehensible how any one who has acquainted himself with the virtues of the silver suture can prefer another, it is also equally strange that the merits possessed by Simon's method of exposing fistula is so little appreciated. In an obese patient, with a fistula situated high in the vagina or with an extensive loss of tissue at the base of the bladder, the opening can be brought into view and made accessible to operative procedures by the breech-back position and the Simon specula in a manner not attainable by any other means. Some have objected to the Simon position because of the sagging of the anterior wall, but this defect will not be observed if the patient is put in the *position as taught by Simon*, and not simply in the ordinary dorsal decubitus.

*Bozeman's Method.*—In 1856, Bozeman published his mode of operating upon vesico-vaginal fistula, the distinctive and original feature of which is the "button" suture. He was one of the earliest and most

<sup>1</sup> *Deutsche Klinik*, No. 45, 1868; *Am. Journ. Obstet.*, Aug., 1869.

earnest advocates of a systematic course of preparatory treatment, and, though others have appreciated and insisted upon its importance, none have labored more assiduously, both by publications and practice, to bring it to a systematized method and elevate it to the dignity of being recognized as a regular surgical procedure.

Bozeman's method by "gradual approaches," or kolpocœpētasis<sup>1</sup> as he has called it later, is designed to be the preparatory treatment of such cases as present obstructions to view of, or operating upon, a fistule, and these are almost inevitable sequents of any degree of sloughing. His method began to be developed in 1855 with a case<sup>2</sup> in which there were two fistulæ, one above and one below the obstruction, which consisted of an adhesion that "extended obliquely across from the right side of the cervix to the left side of the vagina, thus concealing from view the os uteri and rendering an exploration of the entire canal impossible." He closed the lower fistule; then, by incision of the adhesion and dilatation of the canal with compressed sponges in an oil-silk bag, overcame the obstacle and was able to close the second fistule.

This method has been more and more extensively employed, until it has become the chief agent in obviating the necessity of kolpokleisis and partial genital kleisis.

In the same proportion that an operation interferes with the function of the organ or region operated upon does it fail to be considered a successful surgical procedure. Kolpokleisis, or partial genital kleisis, interferes with the sexual and procreative functions; consequently, surgeons gladly accept any measures by which they are enabled to avoid that *dernier ressort*.

Through this widening process not only is obstruction to view removed, but also a laxness of the walls is obtained by which the edges of the fistulous opening can be coapted without tension.

Dr. Bozeman believes in extending the application of this treatment even to those cases which seem hopeless or appear to demand kolpokleisis. As proof of his claims he offers the following statistics: "Simon, 34 cases treated by genital kleisis out of 105 presented, 32.38 per cent.; Sims, 30 cases by genital kleisis out of 312 presented, 9.62 per cent.; Emmet, 7 cases by genital kleisis out of 75 presented, 9.33 per cent.; Baker Brown, 6 cases treated by genital kleisis out of 89 presented, 6.74 per cent.; Bozeman, 2 cases treated by genital kleisis out of 120 cases presented, 1.66 per cent."<sup>3</sup>

He states that Sims' percentage is approximately correct, and that Simon's is entirely so, as far as concerns occlusion of the vulvo-vaginal

<sup>1</sup> *Trans. Am. Gyn. Soc.*, 1879, p. 391; *ibid.*, 1881, p. 139.

<sup>2</sup> Bozeman: *Vesico-vaginal Fistule*, Montgomery, Ala., 1856.

<sup>3</sup> *Trans. Am. Gyn. Soc.*, 1881, p. 170.

canal and turning the cervix into the bladder, but the latter's percentage does not include cases of obliteration of the os uteri.

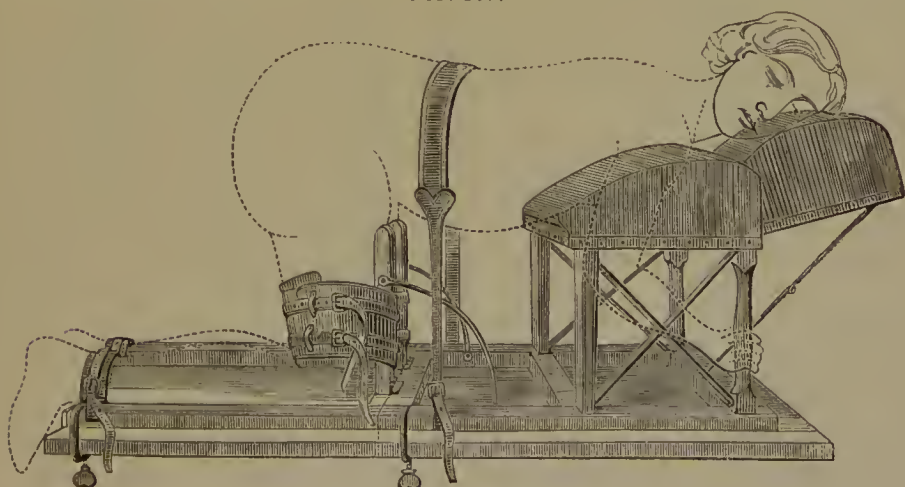
Bozeman explains Simon's high percentage by asserting that the latter "understood thoroughly the value of kolpostenotomy as a means of immediate exposure of the fistule concealed in the vulvo-vaginal tract in simple cases, but he had no conception or appreciation whatever of the value of the combination with it of kolpoepectasis as a means of gradual and certain exposure in the graver cases."<sup>1</sup>

After the constricting bands are cut a process of gradual stretching is begun by means of compressed sponges in an oil-silk bag or by a glass or vulcanite plug. After a certain amount of dilatation other cicatricial bands may be found to interfere, which are also to be severed. This stretching of the canal is continued until not only is the obstruction to view removed, but a laxness of the walls is obtained sufficient to allow the edges of the fistule to be brought together without the slightest tension upon the line of union.

*The Operation.*—The instrument and appliances used are—Bozeman's securing apparatus; Bozeman's perineal retractor or his self-retaining speculum; fistula-knives and curved scissors; tenacula; straight needles; Bozeman's needle-holder; a button-shaper; a button-adjuster; a suture-adjuster; a shot-compressor; a fork; perforated shot; silver wire and silk.

Bozeman in seeking to simplify his procedure has aimed to have as little assistance as possible. With this object in view he devised his

FIG. 107.



Bozeman's Securing Apparatus.

self-retaining tri-valve speculum and his securing apparatus. By the latter the patient is maintained firmly but comfortably in the knee-elbow position, which is the one adopted by him.

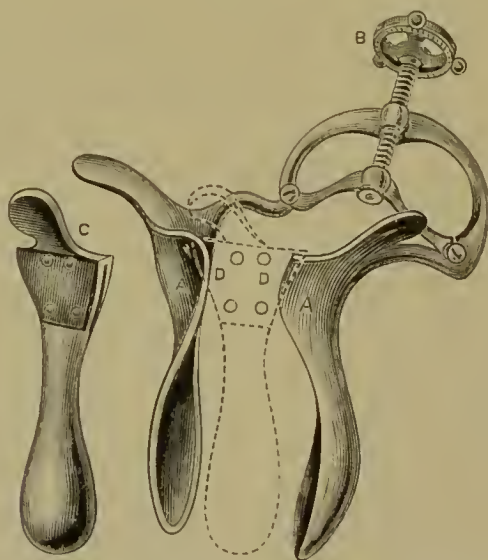
<sup>1</sup> *Trans. Am. Gyn. Soc.*, 1881, p. 171.



If the self-retaining speculum is used, only two assistants are required, one to administer the anæsthetic and another to hand the instruments and sponge; if the duckbill speculum is used, which differs from Sims' only in being more deeply hollowed out, a third assistant is needed.

To adjust the self-retaining speculum the vagina is distended by means of the two lateral blades, after which the third or posterior blade

FIG. 108.



Bozeman's Self-retaining Speculum, used in operating on vesico-vaginal fistula: A A, lateral blades; B, screw for separating the blades; C, posterior blade; D D, posterior blade in place.

is fixed in place if it is needed; the last does not always sufficiently elevate the posterior wall, and it is then necessary to use a special retractor.

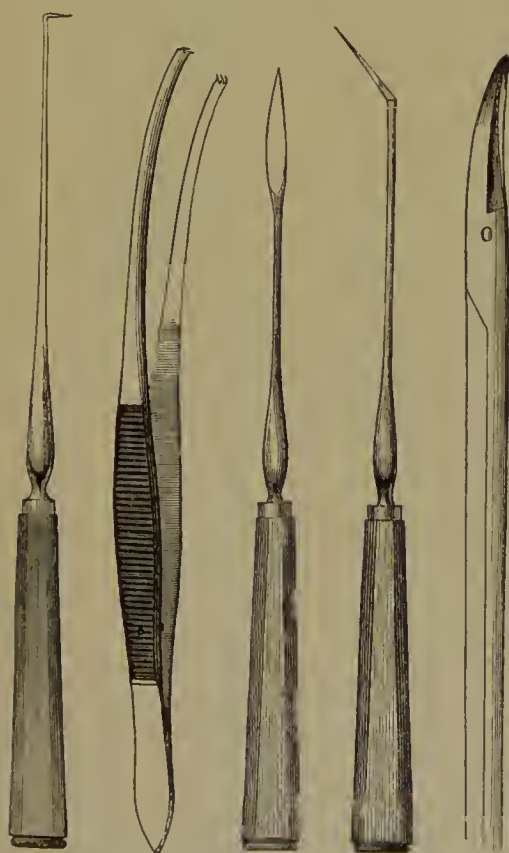
The uterus is never dragged toward the vulva, but the fistula is operated upon *in situ*. The edges are caught up by a tenaculum and pared with a fistula-knife which has its short blade on a plane with its long handle or bent obtusely to the right or left. The margins of the opening are bevelled, but not so much as in Sims' denudation. The angles of the fistule are carefully trimmed with scissors.

After the edges are properly prepared, the silver sutures are to be introduced in the usual way by attaching them to a loop of silk. The stitches are passed through all the tissues of the septum except the vesical lining, which is avoided by bringing the needle out just above it. The sutures are placed, usually, some less and not over half an inch from the freshened edge, and about a quarter of an inch apart. The spear-shaped needle is used; the needle-holder consists of a steel clasp with a long shaft and a flexible canula for approximating the branches of the clasp. The parts which grasp the needle are grooved in several

directions in order to hold it firmly and allow it to be placed at different angles.

The ends of each suture are put through the adjuster, which is pressed down upon the line of union, while at the same time gentle traction is made upon the wires, thus bending them in the way to produce perfect coaptation after the adjustment of the whole apparatus. Knowing now what the size and shape of the fistule will be when it is drawn together, the metal button is cut

FIG. 109.



Fistula-knives, straight and bent; forceps for catching and scissors for trimming edges.

FIG. 110.

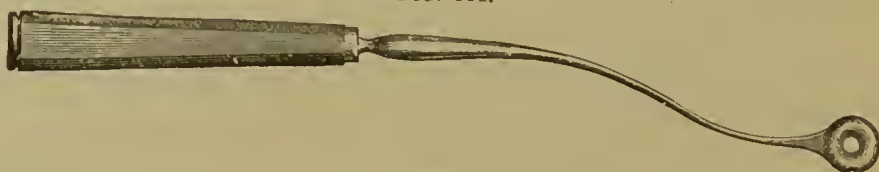


Bozeman's Needle-holder.

to correspond. With scissors and knife it is cut out of a thin sheet of lead, holes punched to agree in number and direction with the sutures, and brought to the desired concave form by suitable forceps. The wires are then passed through the holes in the button, which is pressed down firmly and adapted to the parts by the button-adjuster. Shot are slipped upon the ends of the wires down to the button, and after the sutures

have been drawn up securely each shot is compressed tightly by a strong forceps upon the wires, which are then clipped off rather close and the ends bent over.

FIG. 111.



Bozeman's Suture-adjuster.

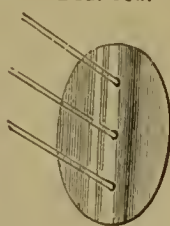
A straight line of union is by far the best, but the shape of a fistule at times is such as to render this impossible: in this case the button must be cut, bent, and perforated to conform to the line of closure.

FIG. 112.



Bozeman's Button-shaper.

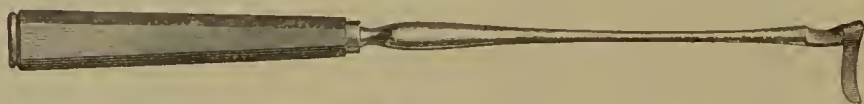
FIG. 113.



Wires passed through the Button.

The apparatus is not allowed to remain longer than the tenth day, and is usually removed on the seventh. To do this, clip the wires with

FIG. 114.



Button-adjuster.

long curved seissors between the shot and the plate, take off the latter, and draw out the sutures.

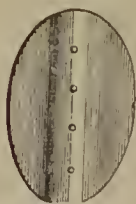
An ordinary English catheter is kept in the urethra, and opium enough administered to quiet pain. In general, the after-treatment does not differ from that of other gynecological operations.

The advantages claimed for this method are—

1st. The plate gives the margins complete rest, and supports them in such a manner as to maintain them exactly in the plane in which they were united.

2d. The line of cicatrization is protected from the urine and vaginal secretions.

FIG. 115.



Button Adjusted and Shot Compressed.

3d. "The independent action of each suture renders parallelism unnecessary, and thus gives the operator the liberty of introducing them in whatever direction may best suit his purpose."

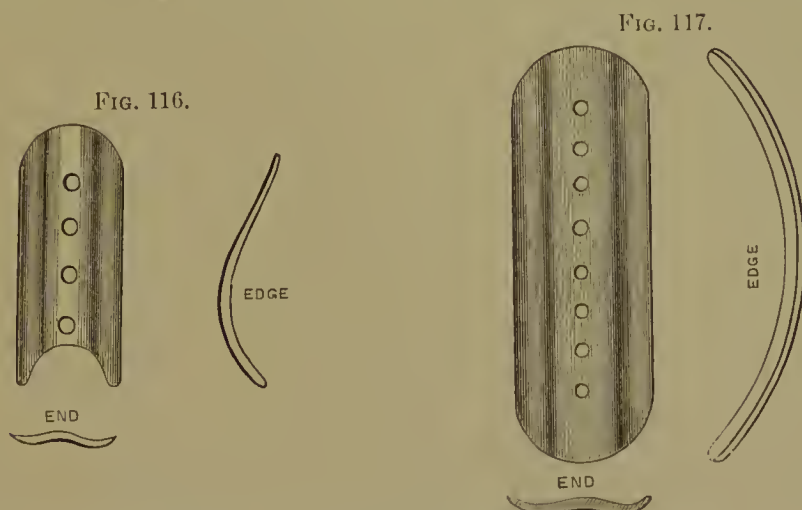
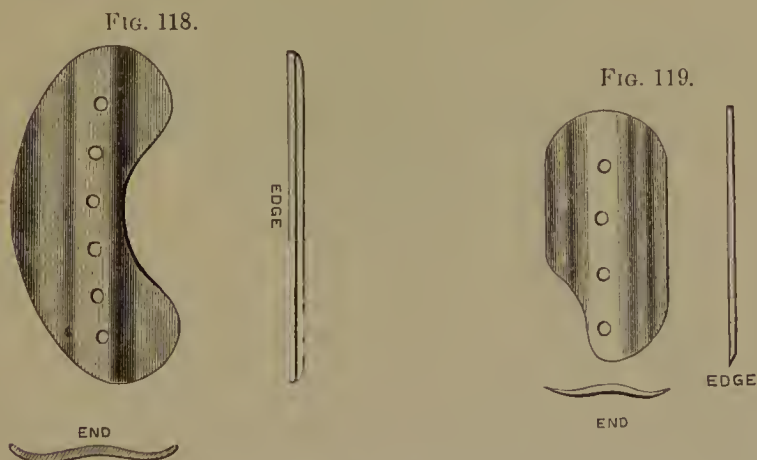


FIG. 116.—Shape of Button for Urethral Fistule: notch in the end to accommodate and support a catheter, which is introduced before the button is adjusted (Bozeman).

FIG. 117.—Button for Fistule, just above neck of bladder, curved for arch of pubes.

4th. The position of the patient and the mode of exposing the fistula are such that the operator requires but little assistance.



Buttons adapted to Fistules lying near or involving the Cervix Uteri: Notch for the Cervix.

This procedure has been very successful in the skilful hands of its deviser, and many American as well as English, Scotch, and French operators have practised it. Since 1857, however, when Sims advocated the use of the simple interrupted silver suture on account of greater ease of application combined with equal or wider usefulness, operators have



gradually but quite generally relinquished both the "button" and "clamp" suture to adopt the simpler one.

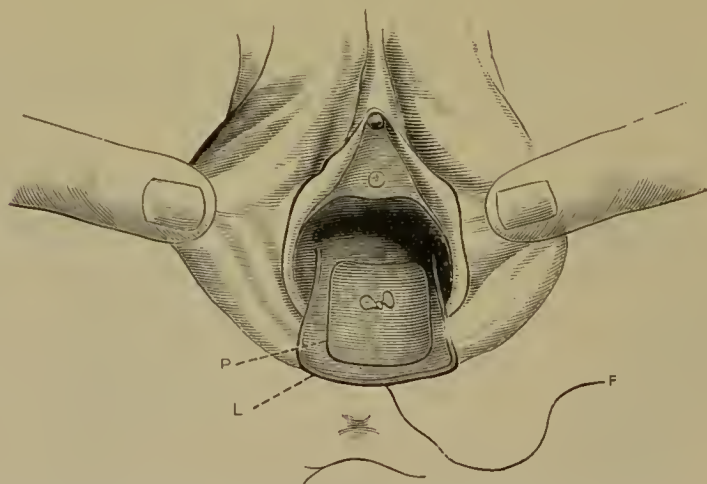
*Transplantation.*—A method of treating vesico-vaginal fistula by this procedure was introduced to the profession in 1834 by Jobert (de Lamballe) under the name of elytoplasty, an operation upon the same principles as rhinoplasty. It has been employed by several operators, principally French, who have varied it by obtaining the flap from diverse localities and using different methods of retaining it in place.

The edges of the fistula having been freshened, a flap is dissected up from the inner surface of the labium, buttock, or thigh, its bleeding surface applied to the fistula, and fastened there by sutures. A catheter is maintained in the bladder during the process of union.

A premature section of the flap at its base has caused the operation to be a failure; Jobert reported one case of non-success from this cause, gangrene setting in on the twelfth day.

Velpeau<sup>1</sup> obtained the flap from the posterior wall of the vagina opposite the fistula by making longitudinal parallel incisions and dissecting up the tissue between them. This was sutured to the previously

FIG. 120.



Autoplasty by a Flap taken from the Recto-vaginal Septum opposite : F, suture; P, metallic plate for supporting the flap; L, flap (Leroy d'Étiolles).

vivified margins. Leroy d'Étiolles<sup>2</sup> procured a flap from a point somewhat lower. A transverse incision was made below the fourchette; two longitudinal incisions met this at right angles; raising the tissue within

<sup>1</sup> *Nouveaux Éléments de Médecine opératoire*, 2d ed., 1839, vol. i. p. 702. and vol. iv. p. 446.

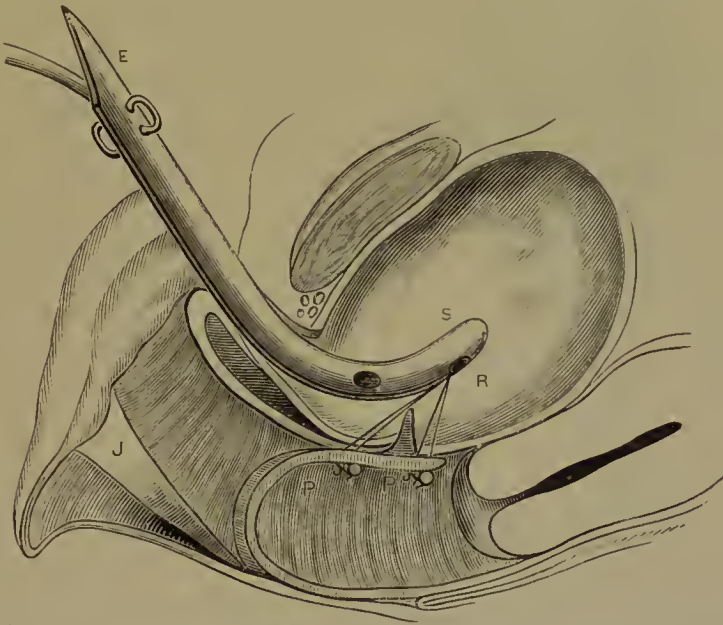
<sup>2</sup> *Moyens nouveaux de Traitement des Fistules vesico-vaginales*, presented before the Academy of Sciences, Aug., 1842.

these lines, a quadrilateral flap was obtained which was rolled upon itself and its bleeding surface applied to the fistula.

At the present time the tissue to be transplanted is obtained in much the same manner as was done by Velpeau and Leroy d'Étiolles; but our increased surgical facilities and improved methods of exposing the fistula allow the flap to be secured to its place by sutures more firmly and satisfactorily than either of the above-mentioned surgeons, or Jobert even, was able to do.

Theoretically, transplantation in some form would seem particularly applicable to those fistulæ in which there is great loss of substance, but practically it has seldom been found so. The difficulties attending its performance and the uncertainty of its results have caused it to be

FIG. 121.



Flap in place: PP, sutures; S, catheter; R, opening in the catheter (Leroy d'Étiolles).

superseded by other simpler and more reliable procedures which the surgery of these days offers.

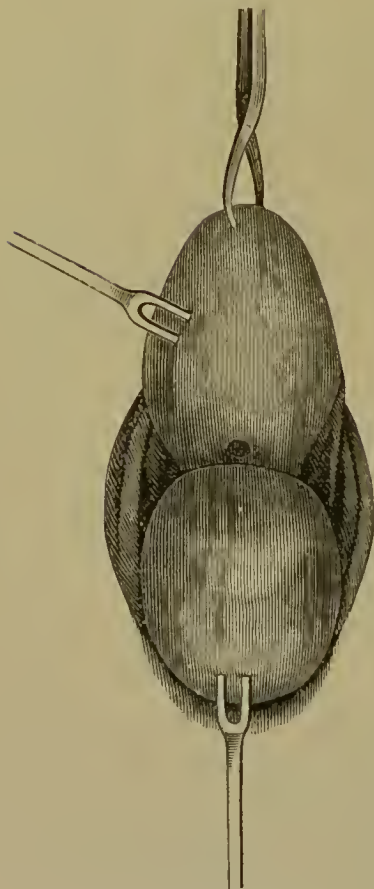
#### LESS FREQUENT FORMS OF FISTULÆ AND THOSE DEMANDING SPECIAL TREATMENT.

##### VESICO-UTERINE FISTULÆ.

In this a communication exists between the bladder and the uterine canal without external alteration of the cervix. It is usually in the form of a small sinus situated near the junction of the body and neck of the uterus. It would be improbable that a fistula could occur much above this locality without an early fatal result, from the escape of

urine into the peritoneal cavity, unless the opening were caused by a pelvic abscess opening simultaneously into the bladder and uterus.

FIG. 122.



Vesico-uterine Fistula (Hegar and Kaltenbach).

If urine is seen to issue from the cervix, it is fairly safe to conclude that there is a vesico-uterine fistula, but the possibility of that rare form, uretero-uterine fistula, occurring, must also be borne in mind; for, should it be the latter and the operator have performed hysterokleisis on the supposition that it was the former, the violent symptoms of hydronephrosis and uræmia would shortly ensue.

Jobert approximated the true method of treatment when he split the neck transversely until the fistulous opening was revealed, vivified the edges of the fistula, and united them with sutures. The two sides of the cervix which had been separated by the incision were then allowed to fall together by their own weight, but were not secured by sutures.

Fig. 122 illustrates a case operated upon by Kaltenbach, in which he split the cervix beyond the vaginal junction, dragged it down by hooks, made a steep, oblique freshening of the fistulous margins longitudinally, and introduced seven sutures to coapt them.<sup>1</sup>

In spite of the great number of cases under his observation and treatment, Simon operated only once by direct closure of the fistula. This he was able to accomplish without splitting the cervix, and Spiegelberg and Lassen have done the same.

Martin and Lassen dragged the fistula down by a catheter introduced through the urethra.

It has long been thought that the basis of proper treatment would be the reproduction of the original injury, which, as first pointed out by Emmet, is a laceration of the cervix extending into the bladder. The rent heals below, leaving a fistulous opening above; and this is the condition which presents itself to the operator. It is a rational theory, and success has attended its practical application.

The anterior lip is slit up to the fistula; the edges of the latter are

<sup>1</sup> Hegar and Kaltenbach: *Die Operative Gynäkologie*, p. 623.

freshened longitudinally. The whole is then brought together by sutures in much the same way as in simple laceration of the cervix. Great care is observed in the insertion of the upper sutures in order to ensure the closure of the fistula.

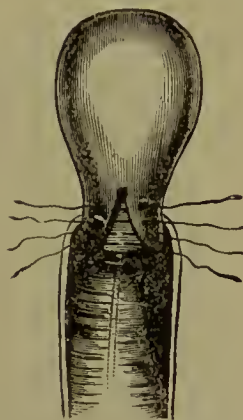
The following novel procedure has been practised by Folet (of Lille) when the fistula is situated at the junction of the neck and body of the uterus: He dilated the urethra to a diameter of 22 millimeters with a Dolbeau dilator; then dragged the cervix to the vulva. Placing one finger in the bladder as a guide and support, he dissected the bladder from the uterus through the vagina until he reached a point a little above the vesico-uterine communication; then, bending the finger toward the rectum, he brought within access the fistulous opening in the bladder, which was closed with four Lembert sutures. The fistula was cured, but a persistent incontinence resulted from the too sudden and extensive dilatation of the urethra. The latter circumstance, however, does not destroy the value of the procedure, since it is by no means a constant sequence of dilatation of the urethra. The operation is said to be both easy and expeditious.<sup>1</sup>

Cure of vesico-uterine fistula has been obtained by Simpson, Spiegelberg, and Polaillon through cauterization with the solid stick and with the actual cautery.

Cases of spontaneous closure have been reported;<sup>2</sup> indeed, Michaelis and Martin consider that this is not of infrequent occurrence.

Should the aperture be much above the vaginal junction—that is, so situated that the incision and the freshening would endanger the peritoneum—direct closure must be abandoned, and indirect closure by hysterokleisis be resorted to. This necessitates menstruation through the bladder, and is followed by sterility. The vesico-uterine passage being usually narrow and sometimes crooked, uterine colic may occur after hysterokleisis, and the uterine contractions have been sufficiently violent to rupture the cicatrix.

FIG. 123.



Cervix Slit to Expose the Fistula and Sutures Passed.

#### VESICO-UTERO-VAGINAL FISTULA.

This class includes several conditions which vary from a simple laceration of the cervix and vesico-vaginal septum to total destruction of the cervix.

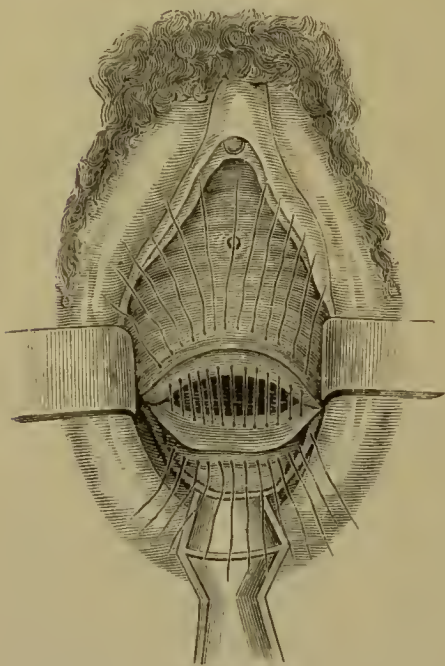
<sup>1</sup> *Soc. de Chir.*, June, 1886, and *Dict. des Prog. Sci. méd.*, 1886.

<sup>2</sup> Polaillon: *Bull. de la Soc. de Chir.*, 1876, Nos. 4 and 5; Bouqué: *op. cit.*



If there is a rent uncomplicated by the malformations resulting from sloughing, no difficulty will be found in freshening and uniting the

FIG. 124.



Vesico-utero-vaginal Fistula, anterior lip pared (Monteros).

edges by sutures, except it is in placing the two or three suture which must pass through both the vesical wall and the cervix in case of a longitudinal fistula. These latter are to be introduced deeply and carefully, in order to ensure union of the septum adjacent to the cervix, where a small opening is liable to remain after the rest is healed.

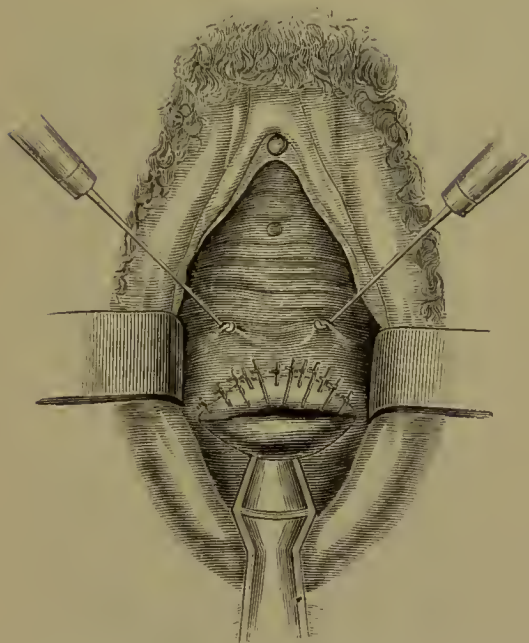
In rare instances the cervical tear extends beyond the fistula. The injury to the cervix must be repaired in order to secure closure of the fistula by the direct method. Dr. Bozeman, who seems to have been the first to point out the proper treatment, makes two operations.

In most cases in which the cervix is involved some portion of it has been destroyed by sloughing. If a part of the anterior lip remains sufficient to coapt with the posterior edge of the fistula, it is pared and united with the freshened posterior margin.

In cases where the anterior lip has been so extensively destroyed as not to admit of closure in the preceding manner, the inferior border of the fistula may be united to the posterior lip of the cervix. The menstrual fluid will then be discharged through the bladder.

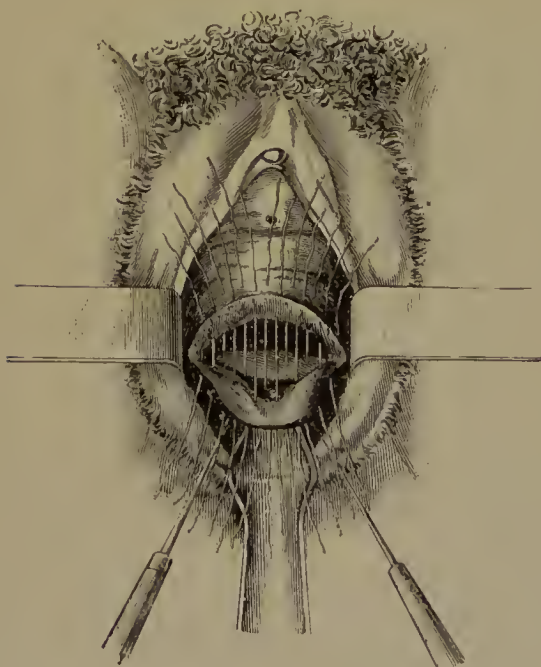
Though sterility is the rule after the last procedure, still pregnancy has been known to occur. Deroubaix relates the history of such a case in which he had performed hysterokleisis for vesico-utero-vaginal fistula. Subsequent examinations showed that a small aperture at the middle of the cicatrix remained, which barely admitted a fine probe that passed toward the bladder; but there was no leakage from the orifice when water was injected into the bladder. The woman declared that, ordinarily, there was no incontinence, though she lost a little urine if she waited much beyond her usual time of evacuation. Menstruation took place through the bladder without inconvenience. About a year after she again presented herself in a worse condition than she was previous to her operation. The explanation was that pregnancy had supervened, which ended in miscarriage between the third and fourth months.

FIG. 125.



Vesico-utero-vaginal Fistula, sutures in place (Simon).

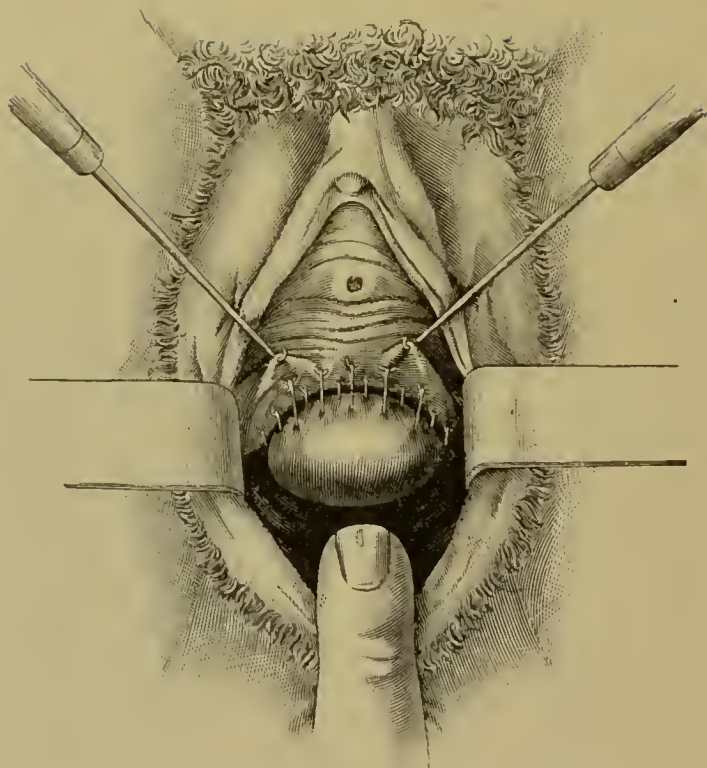
FIG. 126.



Vesico-utero-vaginal Fistula, posterior lip pared (Simon).

A peculiar feature of this was that the fœtus first passed into the bladder, and one arm had even been extruded through the urethra, but after

FIG. 127.



Posterior Lip united to Anterior Edge of Fistula (Simon).

ward the whole was expelled by the vagina. The patient's statement was confirmed by the physician who delivered her.<sup>1</sup>

This practice of utilizing some portion of the uterine neck as an anterior border of a vesico-utero-vaginal fistula is another example of Jobert's skill and ingenuity. These methods of closure have been modified and improved by Emmet and Bozeman, but more especially by Simon, by whom brilliant results have been accomplished.

#### URETHRO-VAGINAL FISTULA.

An abnormal opening in the urethral canal is usually the result of laceration. Unless the neck of the bladder is involved, incontinence is not a sequence, but at the time of micturition the urine is poured out into the vagina, the effect of which is to produce disturbances serious enough to cause the patient to look upon the defect as a misfortune.

The denudation should be extended upon the vaginal surface in order to procure a sufficient breadth of uniting surface, as the urethral walls are not only thin, but, containing erectile tissue, are easily cut through by the sutures. The line of union should be in the longitudinal axis

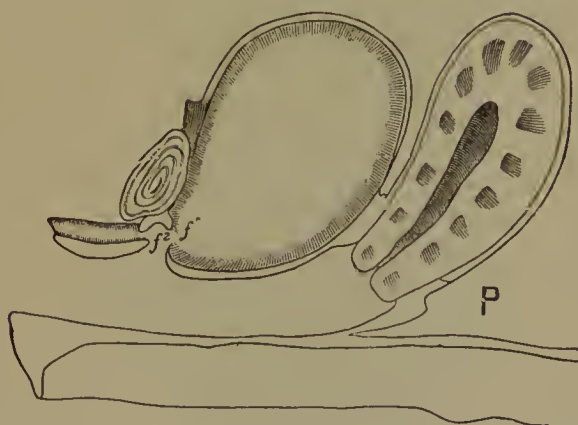
<sup>1</sup> Deroubaix: *Fistules uro-génitales de la Femme*, Obs. xx.

of the canal, that the subsequent contraction of the cicatrix may not cause any constriction. The sutures are of finer wire than is ordinarily used, No. 30, and are introduced over a catheter. It is more necessary that the wires lie parallel and emerge at a like distance from the edge in this case than in that of some other fistulæ. The sutures may penetrate the entire thickness of the urethral wall, emerging in the canal if it is necessary in order to get a firm hold; the wire-holes will take care of themselves unless a suture cuts out. Should there be much traction on the stitches, lateral incisions may be made at a little distance from the line of union.

Cases are met with, though seldom, in which there is atresia of the upper portion of the urethra, accompanied by a vesico-vaginal fistula, situated just above the neck of the bladder. Jobert, Roser, and Neugebauer have observed cases of this sort, and operated upon them by penetrating the atresia with a trocar and maintaining perviousness by increasing sizes of catheters. Simon has also employed this method, but, on account of the tendency of the dense scar-tissue, through which the opening is made, to contract as soon as constant dilatation is discontinued, he preferred to cut away the atresia rather than to penetrate it.

A more complicated condition exists when the urethral atresia is accompanied by two or more fistulæ—a urethral below and one or more vesico-vaginal above—between which lies the section of occluded urethra.

FIG. 128.



A Vesico-vaginal and Urethro vaginal Fistula divided by an Atresia of the Urethra.

In this variety the atresia cannot be rendered pervious, but must be bridged over. To do this Simon employed one of two procedures: 1st. Uniting the superior border of the vesico-vaginal fistula to the inferior border of the urethro-vaginal fistula. When the vesico-vaginal opening is small and the atresia is short, this method has been successful in obtaining complete continence.<sup>1</sup> 2d. Transplantation of the vesico-vaginal

<sup>1</sup> Simon: *Mittheil. a. d. Chir. Klin.*, 1861-65, p. 136, Case 30.



FIG. 129.

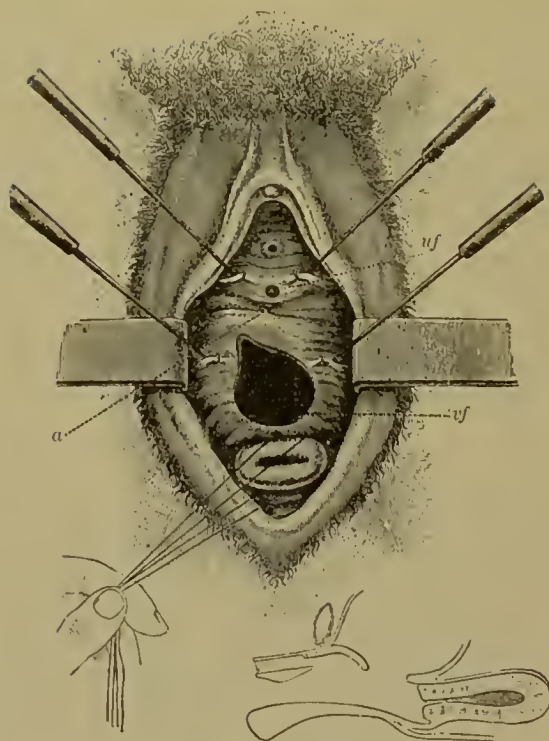
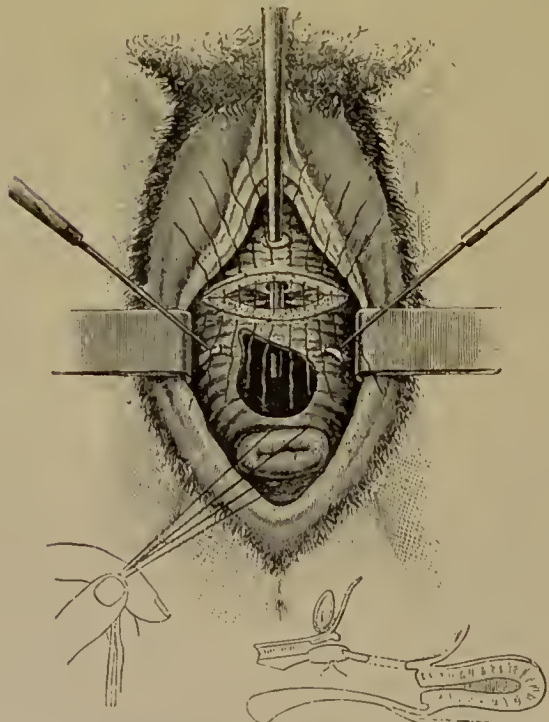


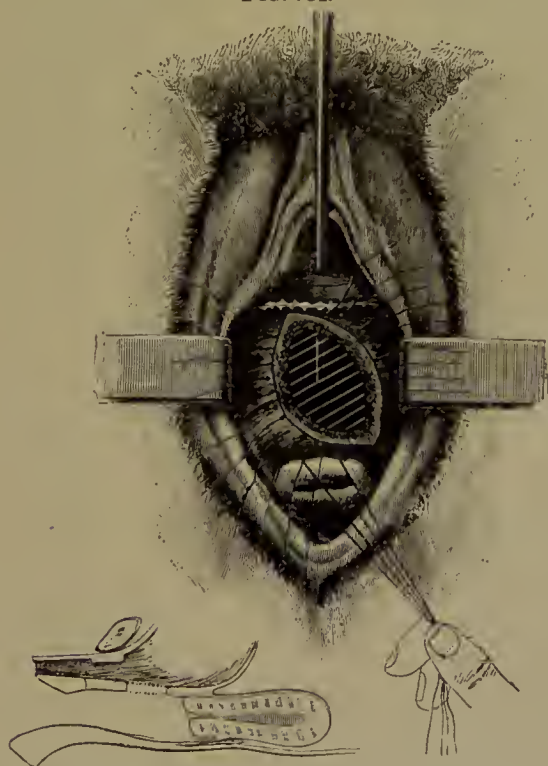
FIG. 130.



FIGS. 129 and 130.—Bridging over an Atresia and Closing a Urethral Fistula by Transplantation of the Vesico-vaginal Wall (Simon): *a*, atresia; *uf*, urethral fistula; *vf*, vesical fistula

wall on the pervious portion of the urethra. In case the vesico-vaginal fistula is large, union by the preceding method would either be impossible, or if possible would be unsatisfactory in its results: a transverse line of union of edges so widely separated as these draws the already shortened urethra upward in such a manner as to produce persistent incontinence. To avoid this outcome the following method is used: An artificial vesico-vaginal fistula is formed just above the neck of the bladder. This fistula opens into the urethral fistula and into the unoccluded part of the urethra. The superior border of the artificial opening is then united with the pervious portion of the urethra. When healing has taken place the vesico-vaginal fistula above is closed. By this procedure the distance from the superior border of the large fistula

FIG. 131.



Urethral Atresia bridged over; diagonal line of union in closing the vesico-vaginal fistula (Simon).

to the meatus is spared the great shortening which must necessarily follow from direct union, if union were possible, between the upper border of the large opening and the lower border of the urethral fistula.

**LOSS OF TISSUE AT THE NECK OF THE BLADDER.**—This is the result of sloughing or laceration, but most frequently the latter, which is produced by traction made while the bladder is full. The injury

usually involves both the urethra and the adjacent soft parts between the rami.

The chief difficulty to vivification and introduction of sutures is the prolapse of the hypertrophied tissues anterior to the neck of the bladder. This obstacle may be overcome by passing in a large sound, which not only dilates the urethral canal, but also presses back the prolapsing mass. The sutures are then introduced over the sound.

**FISTULÆ WITH GREAT LOSS OF SUBSTANCE AT THE BASE OF THE BLADDER.**—This is the result of extensive sloughing, which may have been so great as even to preclude all possibility of bringing the edges in juxtaposition. In these cases the neck of the uterus is utilized to fill the gap. Dr. Bozeman has recommended a procedure by which this may be successfully accomplished. The uterus is dragged toward the vulva daily for several weeks before the operation by seizing the cervix with forceps. Thus the cervix is brought to the opening which it is designed to cover. The anterior lip is then freshened and united by sutures to the position of the septum remaining. Another method is to slit the cervix to the vaginal junction and secure it over the opening by means of sutures.

In cases of large fistula which still have sufficient breadth of border, or where sloughing has not destroyed the laxity of the surrounding tissues so that the edges can be approximated from different directions, it has been found that by varying the course of the line of union, which also varies the lines of tension, they can be closed by immediate coaptation. Simon, who has been successful in the practical application of this principle, has found that the inverted Y-shaped, the bow-shaped, and the T-Y-shaped (⋈) best meet the requirements. The λ-shaped line of union is applicable to pointed heart-shaped fistulæ in which the point is at or toward the urethra, the extreme breadth in the anterior cul-de-sac, and the indentation in the median line, usually at the cervix. The edges from the urethra back to the cervix are brought together in the longitudinal axis. The posterior portion of the fistula is then united transversely to this, the cervix being in the middle of the line of union and situated at the junction of the stem with the branches of the λ.

The ⋈-shaped union is adapted to fistulæ in form resembling an oblong or square.

At first, Simon performed the operation in one, two, or three sittings. Afterward, however, he adopted the plan of operating upon the whole, at one sitting *by sections*—namely, vivifying and uniting one portion before beginning another. The advantages of the latter method are—a saving of time both in the performance of the operation and in the period of recovery; a part of the fistula having been closed, the remain-

der is brought together with greater ease and exactness, since all the parts have approached each other.

This method by broken line of union has made direct closure pos-

FIG. 132.

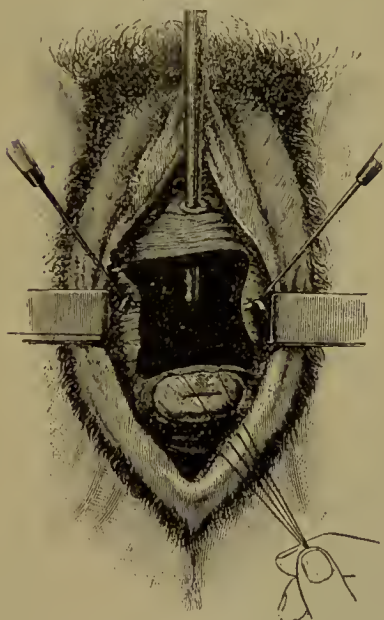
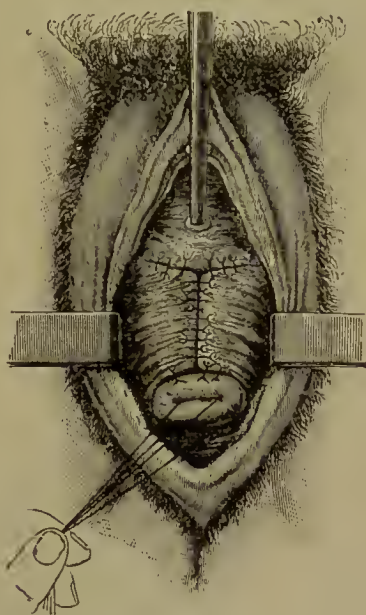


FIG. 133.



⌘-shaped Line of Union in a Large Fistula (Simon).

sible in fistulae otherwise not amenable to treatment, except indirectly by occlusion of the canal.

**OBLITERATION OF THE URETHRA AS A COMPLICATION OF THE ABOVE.**—Along with a considerable loss of the septum there may be absence of the neck of the bladder and a part or whole of the urethra. In these cases a closure of the opening does not always ensure continence. However, if the abundant loose tissues about the neck of the bladder have not sloughed away, continence may be obtained although there is no true sphincter.

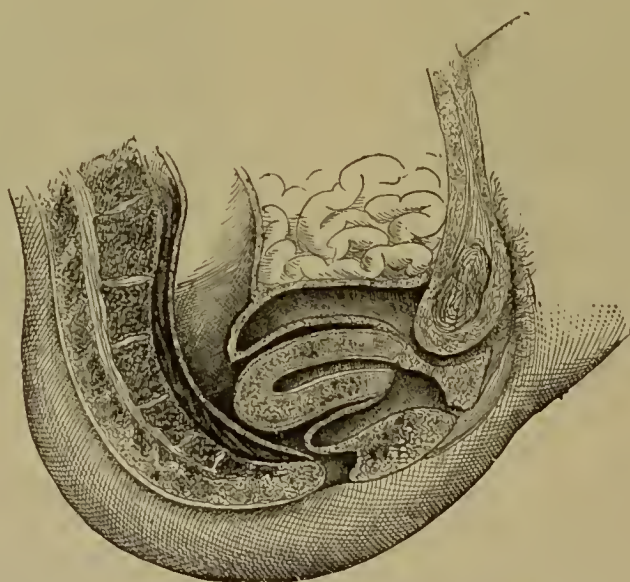
When only the neck of the bladder or the upper portion of the urethra is destroyed, the uterus may be dragged down to fill the gap in the septum and the cervix be united to the stump. But unless the urethra is so united to the cervix that the latter is made to press forward against the pubes as the bladder rises with the accumulation of urine, there will be incontinence. To obtain the desired mechanical action of the cervix, the urethra must be united to the anterior lip just forward of the os. Should the remaining portion of the urethra be short, or should it be much drawn back by its union with the cervix, it then simply acts as a straight and open drainage-tube through which the urine constantly escapes. This condition will necessitate lengthening the urethra anteriorly—a remedial procedure employed by Emmet for



these cases. Prolonging it beyond the normal opening results in a forward and finally upward curve which causes the urine to be retained till it has risen as high in the bladder as the new position of the external end of the urethra.

Should total obliteration of the urethra be another addition to the rather chaotic state of things generally found in the class of cases under consideration, then, truly, to attempt restoration both patient and operator must possess an immense stock of patience in order to

FIG. 134.



Cervix uteri united to the Neck of the Bladder to Secure Retention (Emmet).

endure the time and tedium required to accomplish what is a brilliant victory in modern plastic surgery.

To form a new urethra two parallel strips are vivified on either side of the median line. The undenuded portion between the freshened strips is of sufficient width to form a canal of normal diameter. The vivified surfaces are united over a catheter by means of fine silver sutures which are secured either by twisting or by compressing a shot upon each one. The point of communication between the bladder and the new urethra may be at one of two places—high up on the septum or at the most dependent portion.

It was formerly thought necessary to select the former point, so that the traction produced by the bladder rising in the pelvis as the urine accumulates would close the canal before the urine had risen high enough to flow into it. The chief objection to this plan is that the pouch existing below the urethral opening is not always properly emptied, hence there is ever the danger of a collection of stale urine.

This necessitates daily washing out of the bladder. Emmet has recommended a method by which to avoid this difficulty. The urethra is made to open into the bladder at its most dependent portion, and the anterior part of the canal is extended for some distance beyond the normal position of the meatus. The lines of incision diverge as they approach the bladder in such a manner as to form, when united, a trumpet-shaped canal, the expanded end being next to the bladder. This serves a twofold purpose—to maintain continence and to start the flow of urine. This may appear paradoxical at first thought, but it does not when the mechanical principle involved is understood. When the canal is empty the front and back walls of the expanded portion fall upon each other, forming a somewhat triangular body, the base toward the bladder and the apex running out into the lengthened urethra. As the bladder begins to rise out of the pelvis with the accumulation of urine, the tractile power which emanates from this base to be concentrated along the extended apex is much greater and more efficient in drawing the urethra close behind the pubes than in a uniform canal. In the former there is a tendency to centralize the force upon a circumscribed space, while in the latter a lesser force is spread along the entire length.

The expanded portion also assists in opening the canal in this way: contraction of the abdominal muscles forces urine into this part or compresses what is already there, giving to it a wedge action that opens the narrow part of the canal enough to start the stream, which will be continued by pressure of the body of fluid above.

This theory, which has also been found to work very well in practice, is based upon reasonable principles, as are the other operative procedures of this able elaborator and eminent authority upon the operation for fistula.

#### FISTULÆ IN DIFFICULT SITUATIONS.

A small fistula seated immediately in front of the cervix will frequently prove troublesome to the operator. The neck of the uterus is made to serve in the closure of these fistulæ as well as in those which involve a considerable portion of the septum. They are best treated after the plan advised by Emmet. A V-shaped piece is removed from the cervix, but without opening into the canal. The freshening of the edges extends a considerable distance on the vaginal surface, with a long angle at the upper end. Sutures are introduced transversely to the axis of the vagina. The particular evil to be feared is a small sinus remaining at one or both ends of the line of union; therefore the operator should take especial care to procure sufficient width of coapting surface and length of angle. If a sinus remains, it will

probably be at the cervix end of the line of union, and will be a long and very narrow one, usually extending upward along the uterine neck. The difficulty of freshening in the ordinary manner is such as to lead Thomas to adopt another plan. The apparatus used is what dentists call a dental engine, to which is attached a small burr with cutting flanges. When an assistant, by means of the treadle, has caused the burr to revolve rapidly, it is passed along the sinus until the operator is satisfied that it is thoroughly freshened. Deep sutures are then passed to bring the vivified surfaces together. Thomas declares that he has cured by this means several fistulæ just in front of the cervix which would otherwise have been very hard to close.

**FISTULÆ SITUATED AGAINST THE RAMI OF THE PUBIS.**—There is no variety of vesico-vaginal fistula which is more difficult of access and which tries the operator's manual dexterity and surgical skill more than this.

A fistulous opening in the above location is usually large, extending toward or beyond the median line and involving a considerable portion of the septum. It is often somewhat triangular in shape, with the base resting upon the ramus. In these cases there must be two lines of union—one perpendicular to and approaching as near the ramus as possible; the other crossing the first and parallel with the bone. In other words, the lines form a T.

Even in those fistulæ which do not have a broad base upon the bone, there is nearly always a small opening which cannot be closed except in a line transverse to the main one; and for this reason, although there is no base against the bone, there can also be no properly-formed angle. After the main line of union has healed the operation for closing the aperture against the ramus may be undertaken, and for this it is best to place the patient in the knee-elbow position.

If there is enough tissue remaining upon the face of the bone, it is dissected up to form one edge of the fistula. This is done with scissors, or, if extensive, with the handle of a scalpel, in order to avoid cutting an artery which passes along the inner edge of the ramus; if severed, a troublesome hemorrhage may ensue. To facilitate dissection, the flap is held tense by a spring tenaculum. On account of the exceedingly narrow space in which to turn a needle, introduction of the silk loops becomes a difficult matter. Emmet has found that the best way is to pass two loops through the edges at opposite points, each from within outward; then put one loop through the other, draw it through, and thus cause one loop to pass through both edges. Having once introduced the silk, the wire is easily lodged in place.

As a last resort when the tissues upon the inner surface of the ramus are gone, a flap may be dissected from the vagina above and made to cover the opening. The mucous surface is turned toward the bladder.

## URETERAL FISTULÆ.

URETERO-VAGINAL.—The most common location for this infrequent form of fistula is in the vaginal cul-de-sac a little posterior to the cervix. The connection between this lesion and pelvic cellulitis has been spoken of under the head of Causes. The necessity of evacuating the bladder naturally at stated periods shows that but one ureter is involved.

If the fistula is the result of an abscess which has opened simultaneously into the vagina and the bladder, and it can be ascertained that a canal or cavity still remains with which both the renal end of the ureter and the bladder have communication, the vaginal opening can be safely closed. Whether this state of things exists may be determined by the following method: Let some colored fluid be injected into the empty bladder, and if the urine constantly flowing from the uretero-vaginal fistula suddenly becomes colored and doubled in quantity, there is an opening through which the fluid overflows when it has reached the required height in the bladder. Unless the above signs manifest themselves, it is not safe to close the vaginal side of the opening, except the operator satisfy himself as to the existence of a passage by exploratory means of a more radical sort.

Although the diagnosis usually turns upon this point, it has been known to mislead. Levrat has mentioned an instance: In 1879 he saw in Duplay's service a case of uretero-vaginal fistula; milk injected into the bladder escaped by the fistula, and therefore it was considered justifiable to apply the suture. The case terminated fatally, and an autopsy revealed the fact that the ureter alone was involved.<sup>1</sup>

The relations of the ureter to the opening in the bladder and the position of the latter can usually be determined by two probes, one passed into the fistula to meet the other introduced into the bladder through the urethra or through an incision made into the bladder above its neck. In a case where there was difficulty in finding out the exact condition Emmet laid open the septum from just above the neck of the bladder to a point near the cervix uteri, and, having assured himself as to the state of the bladder, the location of the opening into it made by the abscess, and the relations of the ureter to the vesical opening, he afterward successfully closed both the vaginal end of the uretero-vaginal fistula and the artificial vesico-vaginal fistula, having utilized the tract of the old abscess, which had been kept pervious by the urine, to convey the latter from the renal portion of the ureter into the bladder.

After the ureter is severed the vesical end of the tube usually becomes impervious; therefore, unless there is a solution of continuity in the bladder-wall, as just mentioned, the ureter may be said practically to

<sup>1</sup> *Nouv. Dict. de Méd. et Chir.*, vol. xxxviii. p. 213.



communicate with the vagina only, and operative procedures must be regulated accordingly.

Simon's first attempts in treatment were to render the vesical portion of the severed ureter permeable, and then to close the vaginal side of the fistula; but the operations were followed by violent symptoms of retention of urine and the vaginal wound reopened. He therefore, with others, entertained the opinion for a long time that cure was to be obtained only through an indirect method—namely, kolpokleisis, with previous establishment of a vesico-vaginal fistula. The inferior edge of the artificial fistula was to be united to the posterior vaginal wall, or the anterior and posterior walls joined just below the vesico-vaginal fistula. Later, however, he advocated perforation of the bladder at the site of the fistula, and that the ureter might not be occluded by closure of the original fistula its anterior wall is slit up. To do this a sound is passed from the bladder through the artificial opening into the ureter, upon which the uretero-vesical wall is cut (from the bladder) one-fourth to three-fourths of an inch. The ureteral slit is kept open by the daily passage of a large sound. After the edges have healed the vaginal fistula is closed. By this method the mouth of the ureter is removed to a sufficient distance to ensure it against being included in the deep sutures which close the vaginal wound.

Henry F. Campbell of Georgia has obtained a perfect and speedy cure by a similar though simpler procedure. A small bistoury was passed into the ureter, slitting its anterior wall and penetrating the bladder. The vaginal surface about the opening was then vivified, and coapted by silver sutures. The first successful case, in this country at least, was recorded in 1867 by Dr. T. Parvin.<sup>1</sup> With a trocar he formed a new channel into the bladder for the ureter. He made a superficial vivification of the vaginal surface and a portion of the anterior lip of the cervix, and was thus able to suture the vaginal side of the opening without encroaching upon the lumen of the ureter.

It is seldom that the above procedures would be unsafe, since the ureter either opens at the spot where the vagina and bladder lie in close proximity, or if at a high point there has been sloughing and pelvic inflammation, by which adhesion is caused between the vagina and bladder. Should a fistula occur under neither of these circumstances, and therefore perforation of the bladder not be allowable, the following device of Emmet is to be considered: The ureteral canal is extended down the vagina by the same method that a new urethra is formed, until the point is reached where the vagina and bladder approach each other nearest. Here a circular or oval opening is cut in the vesico-vaginal septum, and after the edges have healed a flap dissected from the vagina is made to cover it and the end of the artificial canal.

<sup>1</sup> *Western Journal of Medicine*, vol. ii., 1867.

Emmet has recorded a partial success by this method. The patient unfortunately died of an intercurrent affection just before the time set to complete the work—namely, to effect communication between the artificial ureter and the bladder.<sup>1</sup>

Variations in the mode of procedure with these fistulæ have arisen through Landau's proposition to employ catheterization of the ureter. He introduced a soft catheter into the renal end of the ureter through the fistula, then passed the lower end of the catheter through the vesical portion of the ureter into the bladder, and drew it out through the urethra with forceps. The fistula is then vivified along the exposed section of the catheter. The denudation includes both the vaginal mucous membrane and the lower side of the ureter, and is a long oval extending obliquely. The edges are brought together over the catheter, which is allowed to remain till union has taken place.

Should the parts fail to unite, it is recommended that the original fistula be converted into a vesico-uretero-vaginal fistula. An oval piece extending in the same direction as the lower portion of the ureter is excised from the vesico-vaginal septum. The oval is so placed that the ureter will open into its upper end. Deep sutures which include the vesical mucous membrane are then introduced.

The chief dangers that beset these operations are—1st, occlusion of the ureter by one of the deep sutures; 2d, rupture of the cicatrix by the removal of the catheter.

Bandl operated after a modified form of Landau's mode, but effected cure only after several operations. One failure was due to the first of the above-mentioned possible sequences, the symptoms of retention being so severe that he was obliged to remove the sutures. Hahn employed this method once without success.

Pawlick encountered the second cause of failure, the result of incrustations which had rendered the catheter rough, so that some force was required to dislodge it. In the second operation he employed a long olive-tipped, metallic catheter, which he introduced into the ureter through the urethra and bladder.<sup>2</sup>

Congenital malposition of the ureter is of rare occurrence. Emmet, with his large experience, mentions having observed but one case. Dr. W. H. Baker of Boston has published the cure of a case in which the ureter terminated upon the vaginal surface near the meatus urinarius. He first dissected up the ureter, and, having decided to turn it into the bladder as near its normal point of communication as possible, he next dissected up the vaginal mucous membrane to the left of the median at a point one inch from the internal orifice of the urethra, where he opened into the bladder. After the superfluous length of ureter was

<sup>1</sup> Emmet, *Prin. and Prac. of Gyn.*, p. 851, ed. 1884.

<sup>2</sup> *Archiv f. klin. Chir.*, vol. xxxiii. p. 717, or *Dict. des Prog. des Sci. méd.*, 1886.

cut off the end was placed in the bladder and its edges sutured to the vesical lining; the threads were cut off short and left to ulcerate out into the bladder. The wound on the vaginal surface was then brought together with five silver sutures. The wires were removed on the eighth day, when union was found to be complete, and the threads passed off later with the urine.<sup>1</sup>

Lest a calculus should form upon the raw surface to be turned into the bladder, as happened afterward in the case just mentioned, it should first be allowed to heal, then placed in the bladder, and the vivified vaginal wall brought together over the opening.

URETERO-UTERINE FISTULA.—This exceedingly rare form may be confounded with vesico-uterine fistula, from the fact that in both urine is seen to issue from the uterus. It will be observed, however, in the latter that the position of the patient makes no difference with the flow, as it does with fistulæ of small size communicating with the bladder at a high point; that if the patient evacuate the bladder, then the escaping urine be caught by a urinal or by seating her on a vessel for a stated period, and at the end of the time the urine in the bladder be drawn, the amount which was lost by the uterus and that obtained by the catheter will be equal; that the urine continues to flow when the bladder is kept empty by a permanent catheter in the urethra. But the diagnosis turns upon the point that, as a general rule, when colored fluid is injected into the bladder the urine flowing from the os still remains clear, thus showing that the two do not intermingle.

The small size of these fistulæ and their difficult situation render it almost impossible to define their location or to operate upon them by other than indirect methods. It has been thought possible to convert a uretero-uterine fistula into a vesico-utero-vaginal fistula by an incision extending from the fistula forward into the bladder. Closure is then to be effected as in the vesico-utero-vaginal variety. The uterine end of the opening is so small that it could scarcely be found with a probe, consequently the cervix would usually have to be split up to carry out this plan.

Another method of treatment is by kolpokleisis, with the previous establishment of a vesico-vaginal fistula above the line of occlusion.

The vesical end of the ureter being usually closed, simple hysterokleisis would rarely be permissible. Duclout<sup>2</sup> has placed on record one case in which it was both allowable and successful. Temporary closure of the fistula by cauterization of the cervical canal and by the introduction of laminaria into the cervix, neither of which produced symptoms of retention of urine, led him to suppose that there was communication between the ureter and the bladder; probably the vesical end had remained pervious. Simple hysterokleisis resulted in cure.

<sup>1</sup> *N. Y. Med. Journ.*, Dec., 1878.

<sup>2</sup> *Gaz. méd. de Paris*, 1869.

Hahn records a case in which spontaneous closure took place after another pregnancy. Previous to this he had made an artificial vesico-vaginal fistula, in the superior edge of which he had placed sutures that brought together the vesical and vaginal mucous membranes to prevent subsequent narrowing of the opening, and the inferior edge he sutured to the middle of the posterior vaginal wall. Eight months after he was obliged to reopen the canal by request of the husband, and the patient again became pregnant. After confinement, although the artificial fistula was unaltered, the uretero-uterine aperture could not be found.

*Nephrectomy for Uretero-vaginal and Uretero-uterine Fistulæ.*—This radical procedure was introduced by Simon, who in 1869<sup>1</sup> extirpated the kidney for a uretero-cervical fistula.

In 1879, Zweifel<sup>2</sup> reported a case of uretero-uterine fistula occurring after a fifth difficult labor from contracted pelvis. The diagnosis was established by catheterization of the ureter through the bladder. He had no difficulty in catheterizing the right ureter, which was done through the dilated urethra, but always failed with the left. Being unsuccessful with the various means of relief which were tried, he finally proposed either to perform kolpokleisis, with previous formation of a vesico-vaginal fistula, or extirpation of the left kidney. The latter operation was chosen. The case terminated favorably, and also without subsequent cardiac hypertrophy or any urinary disturbances.

In a few cases the high and inaccessible position of the fistula or failure to cure it by other operative measures has necessitated removal of the kidney for uretero-vaginal fistula.

Up to 1887<sup>3</sup> there have been 14 cases of nephrectomy for relief of ureteral fistula (these include all varieties). Of that number there were 11 recoveries and 3 deaths. Both the abdominal and the lumbar incisions have been employed, but the latter is far preferable, as it has been followed by a much smaller mortality.

A brief résumé of a single case of complicated vesico-vaginal fistula occurring in the author's private practice while he resided in Chicago is here appended, as serving to illustrate certain points in etiology and treatment heretofore described, but the details of the various operations will be omitted. It rarely occurs that one is able by a solitary case to demonstrate such a variety of procedures:

Mrs. B——, primipara, æt. 22, was delivered of a dead child by

<sup>1</sup> R. P. Harris: "One Hundred Cases of Nephrectomy," *Am. Journ. Med. Sci.*, July, 1882.

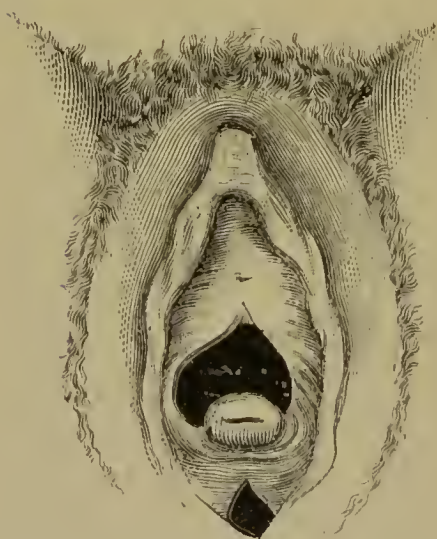
<sup>2</sup> *Arch. für Gyn.*, xv., or *Am. Journ. Med. Sci.*, Jan., 1880.

<sup>3</sup> S. W. Gross: "Nephrectomy" (on a collection of 233 cases), *Am. Journ. Med. Sci.*, July, 1886; Heilbrun: *Centralbl. für Gyn.*, No. 1, 1886; *Dict. des Prog. des Sci. méd.*, 1886.



means of forceps after many fruitless attempts. The forceps were permitted to remain in the vagina eleven hours, during which time occasional attempts were made to drag the dead fœtus through the swollen genitalia. When delivery was effected the perineum and a portion of the recto-vaginal septum were torn through, and in addition the neck of the uterus was extensively lacerated. Subsequently there was a slough of the anterior vaginal wall, resulting in a large vesico-vaginal fistula. She was confined to her bed for several weeks, during which time she had an attack of pelvic cellulitis and an abscess which discharged per vaginam for about two months. I saw her for the first time eight months after her accouchement. She was then in fair health, but a great sufferer in consequence of the immense vesico-

FIG. 135.



vaginal fistula and absence of perineum and inferior portion of the recto-vaginal septum. After fully explaining to her and her husband and friends the length of time that might be requisite to effect a cure, all of the difficulties, sufferings, and possible risks associated with the ordinary surgical operations in similar cases, and also stating that most of these troubles could be avoided by closure of the vagina (kolpoplexis), she elected to have all needed operations for closure of the fistula and recto-vaginal septum. The appearance of the parts prior to

her first surgical operation is represented by Fig. 135.

Altogether, she was subjected to five surgical operations, extending over the space of time from April 15, 1881, to January 31, 1884, in each of which procedures I had the assistance of Drs. H. P. Newman and H. J. and A. R. Reynolds of Chicago. The first operation performed was for restoring the urethral canal, a portion of which had sloughed away and the remainder of which was entirely impervious. The second operation, on July 11th of the same year, closed up a portion of the fistula on the left side; owing to loss of tissue and tension, it was an impossible task to close up any portion of the fistula situated on the right side of the median line. The surgical procedures for the fistula were performed with the patient in Simon's position and by the aid of Simon's specula. The appearance of the fistula on conclusion of adjustment of the sutures of this operation is shown by Fig. 136.

Two subsequent operations were required to entirely close up the

vesico-vaginal fistula. The first one of these two was not as successful as it should have been, on account of the state of the patient's health. In the last one of these, or the fourth upon the fistula, the tension upon the sutures, which extended from the denuded portion of the cervix uteri to the anterior margin of the fistula, was so great after adjustment was completed as to prevent union occurring. Accordingly, for the purpose of overcoming the tension, guy-stitches of strong silk were introduced through the posterior lip of the neck of the uterus, and also through a portion of the anterior vaginal wall near the ostium vaginae

FIG. 136.



FIG. 137.



and on each side. Without this precaution the severe strain upon the silver-wire sutures would doubtless have caused them to cut through, and thus prevent union. The appearance of the fistula, neck of the uterus, and vagina after adjustment of the sutures and introduction of the guy-stitches is shown by Fig. 137.

The fifth and last operation was made January 31, 1884, on the perineum and recto-vaginal septum, and was successful.

Thus, after the lapse of over four years of indescribable discomfort and suffering on the part of the patient, during which time she had been nearly three years under treatment and had been subjected to repeated surgical operations, the damage done by a worse than bungling obstetrician was repaired. But the patient did not at first have perfect control of the bladder, either in voiding or retaining urine; yet the last report made to me a few months after the final operation was that there was gradual improvement in every respect.

INDIRECT CLOSURE.—The various methods of cure for urinary fistulae by obliteration of the genital canal below the fistula began with

Vidal's operation of episiostenosis. Simon and Jobert have improved upon the original procedure by closing less of the genital canal.

The six forms of indirect closure are based upon the site of operation. These are: simple episiostenosis; complete closure of the vulva with formation of recto-vaginal fistula (*obliteratio vulvæ rectalis*); transverse closure of the vagina (kolpokleisis) at the urethral portion, at the base of the bladder, and at the fornix; and partial oblique closure, which leaves one side of the vagina open in part or in its entire length.

The conditions—now but few—which are, in general, considered indications for episiostenosis or kolpokleisis are: loss of substance so great as to prevent any form of direct union, a comparatively rare occurrence; danger of wounding the peritoneum; great amount of cicatricial tissue in the margins, with portions of the latter adherent to the bone; severe hemorrhage. Inaccessibility of the fistula alone is no longer thought an insurmountable barrier to direct operation, but it may become an indication for kolpokleisis if accompanied by the three foregoing conditions. An inverted bladder filled with intestines may result from great destruction of substance and adds to the strength of that indication.

*Episiostenosis*.—After Vidal this method was practised by Wutzer, Bérard, Velpeau, and Dieffenbach, but without success. At some point along the line of union, usually just above the urethra, a small opening always remained. Shuppert was probably the first who obtained perfect closure.<sup>1</sup> The anterior portion of the vagina and the greater part of the urethra being gone, he considered cross-obliteration of the vagina impossible. With a trocar he opened the occluded portion of the urethra, in which a catheter was placed. He then denuded the inner surface of the labia majora, removed the nymphæ, and vivified a narrow strip around the introitus vaginæ. The freshened surfaces were united by silver sutures in a line corresponding to the antero-posterior direction of the vulva. The result was complete continence for two or three hours when the patient was recumbent, but she lost a few drops when walking about.

In cases where there is total loss of the vesico-vaginal septum accompanied by destruction of the entire urethra, or so great a part as to prevent obtaining continence even though the operation for episiostenosis is successful, the remnant of occluded urethra is left unopened, or if pervious is closed at the meatus. A recto-vaginal fistula is previously made to furnish an outlet for the urine, and episiostenosis performed. To form the recto-vaginal opening the posterior vaginal wall is depressed through the anus (Kaltenbach) and a transverse incision made; or, better still, the posterior wall is caused to protrude from the vagina by a finger introduced into the rectum and a piece of the septum excised.

<sup>1</sup> *Op. cit.*, p. 30.

The rectal and vaginal mucous surfaces are united by suture. This avoids leaving any raw surface to collect urinary deposits or to heal by granulation and contact. After the edges have healed, complete closure is performed, although Hegar and Kaltenbach consider it equally good practice to do both operations at one sitting. Before the final obliteration of the vagina is made, however, it is essential that just prior to securing the sutures the cavity to be enclosed be thoroughly cleansed and dusted with some antiseptic powder, such as iodoform, that the vesical side of the wound may remain as aseptic as possible for a few days at least.

Some have recommended that the recto-vaginal opening be made just above the rectal sphincter, but Antal has sought to improve upon this plan and prevent the urine constantly falling into the rectum by communicating with the latter at a higher point. Complete closure of the vulva with formation of a recto-vaginal fistula produces even less favorable results than simple episiotomy. At best, with constipated bowels and continence of urine during a period of a quarter of an hour to two hours, the evils of feces and intestinal gases escaping into the bladder will sooner or later ensue. Decomposition of the urine takes place, which finally causes serious disorders of the urinary tract and rupture of the cicatrix. Should the latter accident occur, it may become necessary to close the recto-vaginal fistula and leave the vagina open.

*Kolpokleisis*.—When this operation is to be performed low in the vagina, the patient is best placed on the back or in Simon's position; but when the site of the operation is high, especially in the fornix, then she should be in the knee-elbow posture.

A strip of mucous membrane is dissected off extending around the vagina. The location of this ring of denuded surface should be far enough below the fistula to be in sound flesh and to avoid the scar-tissue of the margins; and, on the other hand, it should be as far above the outlet as these conditions will permit. Its position and direction are also governed by the varying laxness and tenseness of the vaginal walls at different points; those parts are selected for vivifying which most easily coapt.

A sound is placed in the bladder to serve as a guide while denuding the anterior half of the ring, and a finger introduced into the rectum serves the same purpose while the operator freshens the posterior half. The sutures are placed by passing the short slightly curved needle from without inward through the anterior margin, and from within outward through the posterior margin. Piercing the rectal or vesical lining is to be avoided if possible. Silver wire may now be drawn in if desired. The line of union extends from one lateral column of the vagina to the other, and particular care must be taken both in denuding and suturing



at these angles. After the sutures are fastened, water is injected into the bladder to see if there is any leakage.

The best results are obtained and the least dangers incurred in its performance when kolpokleisis is made at the base of the bladder. Perfect closure of the vagina at the urethral portion is attainable only with some difficulty on account of the thinness and frailty of the urethral wall, which cannot always offer sufficient resistance to the tension of the sutures. In kolpokleisis at the fornix there is danger of wounding the peritoneum in Douglas' pouch while denuding; or if there has been great sloughing of the cervix, especially the anterior lip, the peritoneum may even be injured in this region. When this accident occurs a sharp edge turns out, the upper edge of which has a smooth surface, and a few drops of serous fluid appear. This opening should be immediately closed with a stitch or two, after which the operator can proceed.

When the fistula is situated in one side of the vaginal vault and some portion of the lower margin is adherent to the bone or there is danger of wounding the peritoneum, Simon conceived the idea of closing the affected side and leaving the other half open in its entire length. If the fistula is located in the left side of the vault, the line of union extends diagonally from the right side of the cervix downward and toward the left to the middle of the vagina, or as low as is necessary. The uterus now communicates with the bladder and the menstrual flow escapes by the urethra.

After kolpokleisis menstruation usually appears again, even though it has been long in abeyance. Sterility naturally follows, although in a few cases conception has taken place, and even where the operation for closure of the genital canal had been so successful as not to permit any apparent incontinence of urine.

The reservoir formed by occlusion of the vagina is often difficult to empty completely; consequently, the urine stagnates, cystitis results, and this may, in turn, lead to disease of the ureter and suppurative pyelitis. The formation of stone is another sequence, although Simon has asserted that he observed this result only in those cases where perfect closure had not been obtained or where a thread had found its way into the bladder.

Kolpokleisis, even as a last resort, has not been regarded with marked favor by American surgeons, and some have gone so far as to declare that a patient's total discomfort will be less with a fistula than with kolpokleisis and its after-effects. Where there has been so great a loss of tissue as to allow the inverted bladder, into which the intestines have fallen, to prolapse through the vulva, surgical interference becomes a necessity either to relieve or prevent strangulation. But even under these circumstances Emmet makes closure of the vagina sufficient only to sustain the protruding bladder, and leaves an open-

ing above and below wide enough to prevent any accumulation of urine.

Wearing a urinal and giving careful attention to cleanliness remove some of the worst ills of those who are beyond the hope of cure.

### FECAL FISTULÆ.

Fecal fistulæ consist of abnormal communications between the vagina or labia and some part of the intestinal tract. They have received the following descriptive names: recto-vaginal, entero-vaginal, recto-labial.

ETIOLOGY.—The rectal varieties of fistula are less common than the urinary, though produced by similar agents. These may be briefly considered as of a pathological and a traumatic nature. When a malignant disease, such as cancer, has advanced sufficiently to involve the recto-vaginal septum in its destructive growth, no cure can be looked for. Phagedenic and syphilitic ulceration may also result in a permanent opening. The presence of syphilis with this lesion is, according to Emmet, an important factor in prognosis and treatment. The syphilitic discharge from the urethra or neck of the bladder, finding its way into the anus, excites an inflammation and ends in the formation of an abscess between the rectal and vaginal walls. This abscess opens into the vagina generally just behind the sphincter ani muscle, the opening into the rectum being usually oblique and complicated by stricture of the rectum to a greater or less degree. Stricture of the rectum, which causes a fecal accumulation and ulceration of the septum, may be an active agent; so also an abscess of the vaginal wall, of the labia, or of the glands of Bartholini, which discharges by a double perforation of the vagina or labia externally and the rectum internally, results in a fistulous opening. A like result may be attendant upon puerperal vaginitis accompanied with extensive sloughing of the vaginal wall and destruction of the septum.

Among the rarer forms of injury are those from instruments used in the removal of impacted feces, the administration of elysters, etc. In practice, however, we are chiefly concerned with fistulæ having their origin in childbirth. In instrumental delivery the instruments themselves may tear through the septum, or in laceration of the perineum extending through the sphincter the thicker portion only of the perineum may heal, leaving a fistulous opening above. Pressure in prolonged and difficult labor may excite inflammation and destructive sloughing of the recto-vaginal septum in the same manner as it does when vesico-vaginal fistulæ are formed. If the posterior wall of the upper part of the vagina is torn sufficiently, a knuckle of the small intestine may protrude through the opening, become strangulated, and slough off, giving rise to the artificial anus; or a coil of intestine lying

in Douglas' pouch may be severely compressed in labor, inflammation and adhesion to the posterior cul-de-sac occur, and perforation through the vaginal wall follow, establishing an entero-vaginal fistula.

ANATOMICAL CHARACTERS.—As we have seen, the varieties of fecal fistula, excepting the recto-vaginal, are mostly the result of the burrowing of the purulent matter in finding its escape. The pus from an abscess about the vaginal wall or in the labia may escape by the labia and rectum and establish a recto-labial fistula, while at the brim of the pelvis or within the abdomen by its perforations it may produce a communication between some part of the large or small intestine and the vagina—namely, an entero-vaginal fistula. (For locations of fecal fistulæ see Fig. 84 of vesico-vaginal fistulæ.) The most frequent seat of fistulæ met with is that opening into the rectum just behind the sphincter ani muscle.

Their size may vary from those so small as to allow only the escape of intestinal gas to the entire destruction of the recto-vaginal septum. The recto-vaginal variety is generally much larger on the vaginal side than on the rectal, with the edges bevelled and more difficult of approximation. The communication may be direct, as in the recto-vaginal variety, or long and tortuous, as generally seen in recto-labial fistula.

SYMPTOMS.—These vary somewhat with the size of the opening : if small, only the flatus escapes ; if large, the fluid or semi-fluid contents of the bowel are thus discharged through the vagina. This involuntary escape of the offensive contents of the bowel renders the condition of the patient one of great annoyance and distress.

DIAGNOSIS.—With the above characteristic symptoms the presence and seat of fistulæ should be determined by physical exploration. With the patient upon the back digital examination of the vaginal surface will detect a fistula of any size. If the opening is small, with the patient in the same position and the thighs flexed well upon the abdomen a Sims speculum should be placed under the arch of the pubes, the sides of the vagina separated with retractors, and the surface carefully inspected in a good light. Simon's fenestrated specula are also of great service, since the perineum can be retracted and the posterior wall exposed at the same time (Fig. 103.) Still failing, further aid may be obtained by filling the rectum with milk or a solution of indigo or cochineal, and carefully noting the point of escape within the vagina. If the fistula is one of the small intestine, it may be differentiated by the bright yellow semi-solid discharge of the digested food or chyle, and by the fact that the colored solutions injected within the rectum do not make their appearance in the vagina.

PROGNOSIS.—These lesions, if not too large, may heal spontaneously, and are more liable to do so than the urinary fistulæ because of the less

irritating nature of the discharge. When, however, a natural cure does not follow, resort must be made to operative procedures. They prove no more intractable to operative measures than the vesico-vaginal, though the difficulty of operation is somewhat greater. If, however, the fistula is complicated with syphilis—and, according to Emmet, the presence of a stricture just within the anus is always a probable evidence, if not proof positive, of syphilis—the division of tissues which have undergone such changes only renders the condition of the patient infinitely worse.

**TREATMENT.**—The efforts of nature to repair these lesions of recent origin should be promoted by careful attention to local cleanliness, by the use of concentrated and nourishing food which leaves but little waste for removal by the bowels, and by securing rest of the part through the judicious administration of opium. When, however, the fistula has become chronic and has assumed a permanent character, resort must be had to operative measures for the cure of the affection. Before undergoing radical treatment the patient should be as carefully prepared as in the operation for urinary fistula, by a thorough course of constitutional treatment to ensure perfect health, by subduing local inflammation, and by the removal of any stricture of the rectum that may be present.

The only operation adapted to all forms of recto-vaginal and recto-labial fistulæ is the method by suture, though in the latter variety the ligature has been used with success.

*By Suture.*—The procedure will vary somewhat with the seat of the fistula. In recto-vaginal fistula with the opening in close proximity to the sphincter and it is difficult to obtain union, owing to the contractions of the muscle. In such cases the perineum and sphincter should be divided up to the seat of the opening, the fistulous tract denuded, and the wound closed as in the operation for complete laceration of the perineum. When the septum is involved higher up in the rectum, the same method of paring the edges of the orifice and uniting them by the interrupted silver-wire sutures as that adopted in vesico-vaginal fistulæ is applicable, with the following exceptions: the patient is placed in the dorsal position and the lower limbs well flexed up on the abdomen; Sims' speculum is placed under the arch of the pubes to elevate the anterior wall of the vagina, while the sides are held apart by means of retractors, or Simon's fenestrated specula may be used. Previous to operating the sphincter should be paralyzed by thorough stretching.

If the edges cannot be brought together without too great traction, they may be freed by division of the vaginal tissues. In some instances no amount of division allows of their easy approximation: then the edges must be split on each side to free the vaginal from the rectal



wall. The rectal orifice may then be closed by sutures, while the vaginal surface is allowed to heal by granulation.

Whenever the sides of the fistula can be brought together the opening should be closed through the vagina, for there is less danger of hemorrhage or cutting out of the sutures, the operation is easier of execution, and therefore more likely to be attended with success. If for any reason it becomes necessary to operate through the rectum, it should first be washed out with an enema, the patient placed upon the left side, and Sims' speculum held as in the vagina. A large dressing-sponge with string attached is carried well up to the sigmoid flexure, the edges of the orifice pared and united by silver sutures, leaving the ends bent down toward the anus, that there may be no obstacle to the withdrawal of the sponge or the passage of fecal matter. Concentrated diet should be given and the bowels kept confined by opiates.

*By Ligature.*—Recto-labial fistula may also be treated by the ligature, as first advocated by Professor J. R. Barton<sup>1</sup> of Philadelphia in 1839. Dr. Isaac E. Taylor<sup>2</sup> speaks of this method as the true and correct course of treatment, and has pursued it in more than forty cases. His method, which differs only in minor details from that of Barton, is as follows: "The usual surgical silver probe is introduced into the

FIG. 138.



Taylor's Case of Recto-labial Fistula.

labial orifice, pressed down to the lower part just outside the sphincter ani; the end is then cut open, then withdrawn, and a more slender and ductile one substituted and passed up to the rectal opening through the sinus, having the eye threaded with the ligature: the finger introduced

<sup>1</sup> *American Journal of Medical Sciences*, June, 1839.

<sup>2</sup> *Proceedings of the New York State Medical Association*, 1885.

in the rectum recognizes the probe; this is curved and gradually and gently drawn through the rectum and anus. The two ends are then tied, shotted, and clamped to make it more secure. When the external artificial opening is made it is apparent that we now have simply an ordinary fistula in ano, with an internal or rectal orifice high up in the gut."

The elastic ligature is superior to the silk or wire, does not require almost daily visits for the purpose of tightening or twisting the ligature to keep up the pressure, causes but very little pain in its application, in some cases does not interfere with the patient's business, and cuts itself out in from three to eight days according to the firmness and thickness of the structures to be divided. No after-treatment is needed except cool or warm applications as most agreeable, and an anodyne if needed.

The entero-vaginal variety of fistula, consisting of a communication between the vagina and some part of the intestinal tract above the rectum, may or may not serve as an artificial anus. If the continuity of the gut has been interrupted, as is done by implication of a long loop of intestine, the fistula becomes an artificial anus and the portion below it is in time narrowed, or even occluded. Closure would therefore be attended with serious danger or death unless a free passage could be opened between the upper part of the intestine and a still widely pervious portion of the bowel below the artificial anus. This has been successfully done by Heine. If the vaginal opening is small and connected by a fistulous tract with the bowel, closure of the lower opening would lead to the accumulation of fecal matter in the tract, and probably end in suppuration and abscess. Sometimes, however, small intestinal fistulæ, if cleanliness is observed, close spontaneously or heal after cauterization. As a last resort laparotomy may be performed, the divided ends of the intestine separated from their abnormal connections and resected, then direct enterorrhaphy made.

Recto-anal fistula (fistula in ano), although not strictly belonging to the domain of gynecology, is of so common occurrence among women as to warrant brief mention in an article upon the subject of fistulæ. From a practical standpoint we are chiefly concerned with the treatment of this lesion, the causes and symptoms not differing materially from those present in other fecal fistulæ.

In dealing with this affection there are three recognized surgical procedures for radical cure—namely, incision, ligature, and suture.

The old plan, and the one ordinarily pursued, consists in laying open the whole fistulous tract by incision of the tissues intervening between the fistula and the rectum and allowing the wound to heal by granulation. As a consequence, partial or complete incontinence was not uncommon, even in the hands of skilled surgeons, from division of the

sphincters. Allingham says: "In operating upon women suffering from fistulæ, cut as little as possible, for anything like too free incisions are apt to end in incontinence of feces, or, at all events, in such partial loss of power in the sphincter as to prevent the patient retaining flatus—a result which, I need scarcely say, is a most disagreeable one." The same writer also lays stress upon incising the sphincters at right angles to their muscular fibres. The author's observation convinces him that Allingham has not over-estimated its importance, and that even an oblique incision of the lower sphincter may result in complete incontinence.

The treatment by elastic ligature offers a valuable and generally certain cure for anal fistula, and is to be used where the knife is contra-indicated. The ligature may be applied, as in the method above given for the treatment of recto-labial fistula, by ligature when converted into the recto-anal variety.

The treatment by suture—that is, by complete excision of the fistula and perfect coaptation of the freshened surfaces by sutures—is the only procedure which secures immediate union by first intention. The long and tedious convalescence inseparably connected with the ordinary mode of operating by incision is avoided, and the incontinence at times resulting from division of the sphincter is prevented.

This method was first suggested to the author by his experience with various plastic operations upon the perineum. It has since appeared that the surgical principles there involved were applied to the treatment of fistula in ano by several surgeons working independently of each other, yet following essentially the same details, varied to suit the individual case.

The author's first case of fistula in ano treated in this manner was March 31, 1881, while he was a resident of Chicago, in which he was assisted by Dr. J. W. Mitchell of Knoxville, Iowa, but the technique of the operation was not described by him until 1883, in a paper<sup>1</sup> read by title at the meeting of the American Gynecological Society held in September of the same year. At the same meeting Dr. Emmet also referred to this mode of operating. About the same time Dr. Smith<sup>2</sup> applied this plan of treatment to an old standing fistula which had been treated unsuccessfully six months previously by the old method. The question of priority concerning this mode of operating, however, is not one of major importance.

The details of the operation, performed with antiseptic precautions, are as follows: The patient should be prepared for operation by thorough evacuation of the bowels. This is accomplished by a purge on the two

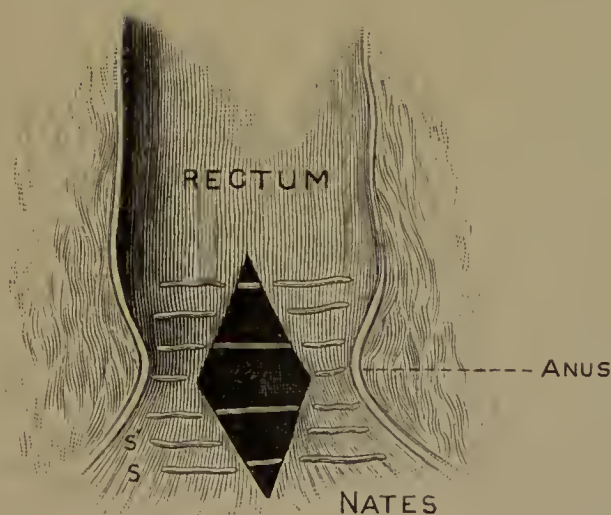
<sup>1</sup> "On a New Mode of Operating for Fistula in Ano," by Edward W. Jenks, M. D., *Am. Gynecological Society Trans.*, 1883.

<sup>2</sup> *Medical Record*, June, 1886.

days preceding, and an injection on the day of the operation. The parts about the fistula are washed and irrigated with the bichloride solution, and the rectum thoroughly cleansed of all fecal matter. A sponge wrung out of the bichloride solution, with a string attached, is carried up to the sigmoid flexure.

With the patient upon the back, or, if preferred, upon the side on which the fistula is located, the routes of the fistulous tracts are carefully determined and incised their entire length, aiming in every instance where the incision involves either sphincter to cut at right angles to the muscular fibres. If the sinus opens into an abscess-cavity, lay it open freely, that its surface may be readily reached. Completely excise the fistulous tract by dissecting out all the so-called pyogenic membrane or tissue along the routes by means of curved scissors or the knife. It is not unusual to find several bleeding vessels on excision, which should be secured by torsion in preference to ligatures, but if ligatures are necessary, the catgut, prepared with chromic acid, or Chinese silk may be used. Not infrequently after cutting a fistula there are found overlapping the incision portions of thin livid tissue of low vitality, which should be cut away in all instances, and the edges carefully pared that they may be brought together perfectly. Deep sutures may then be inserted beneath the fistulous tract to bring into apposition the freshened and healthy opposing surfaces and main-

FIG. 139.



Fistula prepared for Closure: S' and S, alternate deep and superficial sutures.

tain them there until union is effected. These sutures, best of catgut or silk, are inserted by means of curved needles and the speculum, or the rectum may be turned out, with the forefinger used as a hook, to obtain a better view. As the success of the operation largely depends



upon the complete union of the rectal surface, superficial sutures, in addition to the deep ones, are necessary to secure accurate adaptation of the edges of the mucous membrane.

A drainage-tube is inserted at the external or integumentary opening and the wound closed. Several deep sutures may now be made to include the entire field of operation, especially desirable where there are lateral sinuses to the fistulous tract, in order to relieve the adjusted surfaces of too great tension. During the operation the wound should be irrigated with the bichloride or other antiseptic solution. Finally, the sponge is withdrawn, the wound is dressed with iodoform, and iodoform or bichloride gauze applied externally. Opium is given to constipate the bowels for six to eight days, when the bowels are moved by means of laxatives, followed by enemata of oil to secure liquid stools. Concentrated nutritious diet is given, and the patient is kept in bed. The suture should be removed the same number of days after the operation as in similar plastic operations in other localities. When the fistula extends no higher than the sphincter, the divided sphincter and freshened surfaces may be united by silver sutures in the same manner as is done in complete laceration of the perineum.

When the fistula is connected with a large abscess-cavity as well, this may be cured at the same operation. The lining membrane of the cavity is carefully but thoroughly dissected out, and the healthy surfaces brought together and maintained in apposition by sutures passed as in treating the fistulous sinuses.

# DISEASES OF THE BLADDER AND URETHRA.

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## I. ANATOMY;<sup>1</sup> METHODS OF EXAMINATION.

### 1. ANATOMY OF THE URETHRA.

THE dimensions of the female urethra vary considerably at different ages and in different individuals. Its average length may be said to be 30 mm., although even under normal conditions it may reach 40 mm., and sometimes does not exceed 20 mm. In the later months of pregnancy the length is very much increased.

The meatus is the narrowest portion of the urethra, its diameter rarely exceeding 4–5 mm. From here the width rapidly increases for a distance of about 10 mm., then gradually diminishing to the orificium internum.

The wall of the urethra is a very tough, elastic structure, capable of great dilatation without rupture. Its inner coat or mucosa is thrown into several folds, of which the most prominent extends from the apex of the trigonum along the urethral floor to the meatus, where it is joined by two lateral folds to form a small prominence or tubercle called the veru montanum. These lateral folds begin at some distance from the meatus, run at first parallel with the median fold, or very slightly converging, until they reach a point 2.5 mm. behind the orifice, where they bend sharply inward to the veru montanum. Still another easily effaceable fold is found upon the superior wall along its whole extent.

The epithelial layer of the mucosa is composed of several rows of cylindrical cells, of which the most superficial become somewhat flattened as the meatus is approached, while at the vesical orifice they have a battledore shape and send out prolongations into the interstices of the underlying layers. Numerous small elevations or papillæ cover the whole surface of the mucosa.

The glands of the urethra are of three distinct varieties: First we find simple mucous follicles, which are distributed pretty evenly through-

<sup>1</sup> See also article on Anatomy, Vol. I.

out the whole mucosa. Then upon the anterior half of the urethral floor, upon each side of the central fold, are two rows of simple involutions of the mucous membrane, or crypts, also called the glands of Littre. Their course is backward, parallel with the urethral canal. They are usually twenty-five to thirty in number, and are large enough, some of them, to admit the end of a bristle. Sometimes there is an additional row on each side of the lateral folds. Their walls are also supplied with papillæ and mucous follicles.

Of far greater importance than the two preceding varieties are the two glands first described by Skene,<sup>1</sup> and since carefully studied by Koeks, Dohrn, Böhn, and especially by Max Schüller.<sup>2</sup> Their mouths are situated normally 2.5 mm. behind the meatus, at the angles made

FIG. 140.

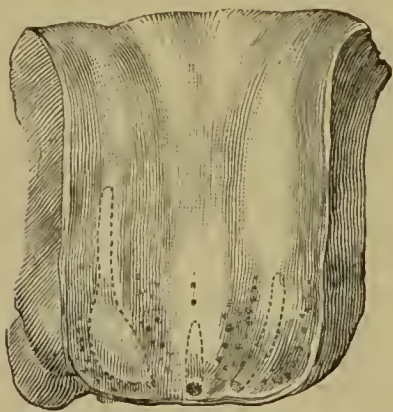


FIG. 141.

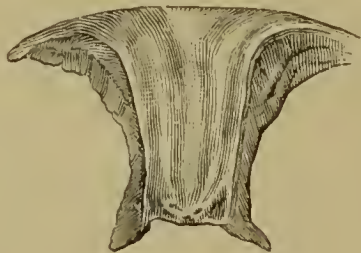


FIG. 140.—From a widow aged 40, dead from infarction of the kidneys and cystitis. Urethra laid open from above, and purposely strongly drawn apart. Very numerous large lacunæ and three urethral passages with round orifices surrounded by marginal swellings. The dotted lines show the extent and form of the passages. Bladder-like enlargement of the right urethral passage.

FIG. 141.—Urethra of a girl 9½ years old, dead from scarlet fever. Lacunæ not visible in the fresh preparation, but visible after immersion of the preparation in spirit. A broad oval with correspondingly formed marginal swellings (lips) surrounding the orifices of the two urethral passages.

by the two lateral folds as they bend inward toward the *veru montanum*. They run backward, parallel with the urethra in the cavernous portion of its wall, for a distance varying from 1 to 2.5 cm., and terminate in several small branches with blind extremities. They admit a No. 1 French probe, are sometimes dilated just behind the orifice, and are clothed with a mucosa similar to that of the urethra and richly provided with papillæ and muciparous glands. Appearing first in the sixth month of foetal life, they attain their highest development during the period of sexual activity, after which they become partially atrophied, so that in old people they are often difficult to find.

<sup>1</sup> *Amer. Journ. Obst.*, 1880, xiii. p. 265.

<sup>2</sup> *Arch. für Path. Anat.*, 1883, xciv. p. 405.

The investigations of Dohrn and Schüller make it extremely doubtful whether these are the remains of the Wolffian bodies, as was supposed by Kocks, and their physiological significance is still unknown.

The submucosa is composed of a fine network of elastic fibres. Beneath this are two layers of smooth muscular fibres—the inner longitudinal, the outer circular. The latter, however, does not completely encircle the urethra except at its posterior half, and is there continuous with the circular fibres of the vesical sphincter. Between the circular and longitudinal layers lies the corpus cavernosum of the urethra, an erectile body made up of connective tissue, elastic fibres, and a large venous plexus. External to all these layers is a layer of striated muscular fasciculi which are partly longitudinal, partly circular: the latter surround the posterior half of the urethral canal and form a voluntary sphincter for the bladder.

The course of the urethra is nearly straight, its anterior end bending slightly upward and its posterior slightly downward, so as to give it a curve which is a trifle sigmoid. In the erect posture its course is nearly vertical.

The urethra is strongly attached to the pubic arch by the median pubo-vesical ligament, which also serves to hold it in position. The interval between the urethra and pubes varies from 10 to 19 mm. Its distance at the meatus from the pubic rami varies in adults from 1.6 to 2.6 cm. when the soft parts have been removed. Below, the urethra is in intimate relation with the vagina near the meatus, the interval between the two increasing up to the orificium internum, where it amounts to about 1 cm. This interval is filled with loose cellular tissue.

## 2. ANATOMY OF THE BLADDER.

The capacity of the female bladder is probably somewhat greater than that of the male. Its shape, too, differs somewhat from that of the latter, being broader, while its antero-posterior diameter is less, owing to the interposition of the uterus between it and the rectum. Sections of the empty bladder, made antero-posteriorly, have disclosed two very different shapes. The usual form which the bladder takes when empty is that of the letter Y:<sup>1</sup> the upper free portion of the bladder, which extends from the neighborhood of the os internum uteri behind to the top of the pubes in front, simply collapses when the organ is fully emptied, so that the summit of the bladder comes to lie upon the vesical orifice (Fig. 141). Thus are formed the two arms of the Y—a posterior, extending backward from the ostium to a point opposite the os internum of the uterus; and anterior, extending upward

<sup>1</sup> Hart: *Edinb. Med. Journ.* for 1879, xxv. p. 892; and 1880, xxiv. p. 794.



and forward to the top of the symphysis. In other cases, however, the bladder has been found to retain, when empty, the oval form, its cavity then forming a slightly curved canal continuous with that of the urethra. In these cases the walls are thick and apparently in a con-

FIG. 142.



Vertical Mesial Section of Fœtal Female Pelvis (spirit-hardened). Empty bladder (c) is above pubis; b, vagina; a, uterus cut to one side (Hart).

tracted condition, which has given rise to the suggestion that the bladder may have been in a condition of systole at the moment of death, the Y-form representing the state of diastole. The oval is the shape always found in young infants, since the bladder does not become a pelvic organ until later in life.

The structure of the bladder is so well known that it demands but little attention here. It has a thin mucosa, loosely connected with the subjacent tissues and sparsely provided with mucous follicles and simple crypts, both of which are somewhat more numerous at the fundus: in this region there are also a few papillæ and occasionally lymph-follicles. The mucous membrane is continuous with that of the urethra and ureters. The latter open into the bladder at the base of the trigone by two narrow valve-like orifices, situated one on each side of the median line about 2.5 cm. from the urethral opening and the same distance

from each other. The internal orifice of the urethra also forms, when closed, a transversely curved slit, the concavity of which faces upward. The muscular coat of the bladder consists of three layers—an inner and outer of longitudinal, and a middle of circular, fibres. At the vesical neck there is such an arrangement of circular fasciculi as to form a well-marked sphincter, which is continuous with that of the urethra. That portion also of each ureter which traverses the vesical wall is so invested with muscular fasciculi that with increasing distension of the bladder there is a corresponding increase in the elasticity of these fibres, which aids the valvular arrangement of the mucous membrane at the orifice of the ureter in preventing a back flow of urine. The vesical opening of each ureter is marked by a slight prominence or ridge, and these two prominences are united by a transverse band called the interureteric ligament.

The serous coat of the empty bladder is reflected from that covering the anterior abdominal wall at about the upper margin of the pubes. It then passes over the summit and sides of the bladder to a point about opposite the internal os of the uterus, from which it passes up into the fundus of this organ. Its attachments in front to the abdominal wall are not at all close, so that when the bladder is distended the peritoneum is pushed up from the pubic region, and a very considerable extent of the bladder comes to be in apposition with the abdominal wall without an intervening fold of peritoneum.

The relations of the female bladder are of great interest because of their bearing upon the etiology of vesical disease. The base of the bladder is loosely connected by cellular tissue to the anterior vaginal wall from the internal orifice of the urethra to the bottom of the anterior vaginal cul-de-sac, a distance of about 4.5 cm. It is then loosely attached to the cervix as far as the internal os, beyond which point it is separated from the uterus by the vesico-uterine peritoneal fold. The ureters enter the vesical wall 1.25–1.50 cm. in front of the cervix uteri, and 4–5 cm. apart; they then run inward and slightly forward, to open into the bladder 2.5–3 cm. from each other and about the same distance from the vesical orifice.

The anterior wall of the bladder is not, as is sometimes stated, closely united to the pubes; on the contrary, this interval is filled with a large amount of fat and loose cellular tissue, which permits the bladder when distended to rise up out of the pelvis into the abdominal cavity.<sup>1</sup>

Laterally, the bladder is in relation with the broad ligaments, and above with the small intestine, rectum, and vermiform appendix. The vesical neck is surrounded by a large serous plexus communicating with that of the uterus and urethra. On account of these important relations the bladder is liable to participation in a great variety of pelvic

<sup>1</sup> Hart: *loc. cit.*

and abdominal affections, to which reference will be constantly made in the following pages.

A word may here be added in regard to one or two points of vesical physiology. It is pretty definitely ascertained that the normal mucous membrane of the bladder is not capable of absorption: with the diseased bladder the case is quite different, since absorption may take place here, as elsewhere, from an eroded or ulcerated surface.<sup>1</sup> The function of the vesical sphincter is still a matter of dispute. It would seem, however, from the experiments of Kaprersow that the sphincter vesicæ plays something more than a merely passive rôle as the bladder becomes distended. This author found that section of the lumbar cord below the sixth vertebra was followed by incontinence of urine, while section above the fourth caused retention. It is probable, therefore, following Kaprersow, Powers, and other authors, that there is a reflex centre in the lumbar cord which receives sensory impulses from the vesical wall, and sends back motor impulses to the vesical sphincter to induce more powerful contractions of the latter as the bladder fills. This centre may at any moment be inhibited by an impulse of cerebral origin, and the bladder be emptied at will. The opposing theory of Rosenthal and Wittich is that closure is effected simply by the elasticity of the fibres at the vesical orifice: this is, however, gradually overcome by the collecting urine, until at last a drop or two escapes into the urethra, the desire to micturate is felt for the first time, and the bladder emptied by an action of the will. The vesicular sphincter is supposed by them to merely exercise the function of expelling completely the last few drops of urine from the bladder, while the power of retaining the urine for any length of time resides in the sphincter urethræ.

The theory of a reflex centre for the vesical sphincter seems to offer a more plausible explanation of certain functional affections of the bladder and the rapidity with which they sometimes yield to stimulating treatment: as instance of this may be cited the immediate effect which electricity occasionally has upon certain forms of diuresis—a fact which it would seem more difficult to reconcile with the supposition of a simply mechanical closure of the vesical orifice. Still, these are questions for physiologists to decide, and must for the present be left undetermined.

### 3. GENERAL METHODS OF EXAMINATION AND DIAGNOSIS.

The mutual relation existing between most vesical or urethral disorders and affections of the other pelvic viscera makes it imperative, in all cases of symptoms referred to the bladder, to examine not only the bladder itself, but also the adjacent organs. Most important perhaps

<sup>1</sup> Alling: *De l'Absorption de la Muqueuse vesico-urethrale*, Paris, 1871.

will be the vaginal touch, which may give valuable information as to the thickness of the urethro- and vesico-vaginal septa, the presence of tumors or foreign bodies in these organs, or of excessive tenderness, losses of continuity, or of urethral and vesical displacements. By the aid of bimanual palpation the uterus and its surroundings are to be carefully explored in search of malpositions, inflammatory deposits, new growths, hypertrophy, and the like. Rectal examination, especially in children, is often to be employed. Abdominal palpation may disclose unusual resistance above the pubes, or a pyriform tumor such as is formed by a distended bladder, or in rare cases a nodular condition of the vesical walls, or other abdominal tumors which exert pressure upon the bladder. Percussion of the abdomen should never be neglected in our search for the same possible etiological factors. Visual inspection of the vulva and anus for the presence of hemorrhoids, fissures, or plaques muqueuses is to be regarded as a matter of course. A sound is next to be passed into the bladder, and any local or general tenderness of the urethra, any obstruction to the passage of the instrument, or any deviation from the normally straight course of the canal is to be carefully noted. Once within the bladder, the beak of the sound should be turned carefully in all directions in search of a possible stone or other foreign body, or if there is any strong reason for suspecting something of this nature which the ordinary sound fails to detect, resort may be had to the sound devised by Napier, the polished end of which is first dipped in a solution of silver, so that it may accurately register any contact with a rough, hard body. While sounding, too, the depth of the vesical cavity is to be noted, which is stated by Duncan to be about 15 cm. from the meatus to the extreme summit of the healthy bladder. The sound will also reveal any excessive tenderness of the vesical mucous membrane or any marked roughness of the vesical wall, such as is caused by trabecular hypertrophy, polypoid growths, cancerous nodules, or phosphatic deposits. Examination of the urine should never be neglected, not only because of the evidence it affords as to the condition of the bladder itself, but because it is important to determine whether there is any renal complication or any excess of urates, phosphates, or other irritating ingredient: urine which has been drawn by catheter is best for this purpose, since that passed by the patient is always liable to contamination with vaginal secretion. The next step in this routine examination should be the use of the endoscope, which deserves a somewhat more detailed description than the other more common methods of diagnosis already named.

*Endoscopy.*—Ocular inspection of the urethral and vesical interiors is obviously highly desirable in diseases of these organs; and yet, in spite of the ease with which this can be accomplished by means of the endoscope, this instrument is still regarded by most practitioners as a refine-



ment worthy only of the specialist. Desormeaux was the first to devise an instrument of this sort, but they have so multiplied in the last decade that there is now plenty of room for individual choice. The only endoscope which brings the whole vesical interior into view is that of Rütenberg; for a description of this elaborate contrivance the reader is referred to the article by Winckel in *Billroth's Handbuch d. Frauenkrankheiten*. By means of this instrument the bladder is kept distended with air while the speculum is in place: Winckel has used it in many cases, and considers it a great accession to our means of diagnosis. The simpler specula, however, answer to the needs of most physicians, and for inspection of the anterior two-thirds of the urethra a couple of hair-pins may be bent at right angles and employed as retractors, the parts being illumined by the ordinary head-mirror and either sunlight or a lamp placed a little to one side of the patient. The various ear-specula may also be used for the same purpose; Reeves has made a very useful endoscope by simply removing a small oval piece from the side of an ordinary silver ear-speculum. Reeves Jackson prefers an instrument exactly like an anal speculum, except that it is much smaller. The self-retaining nasal speculum of Jarvis will also at times prove very serviceable.

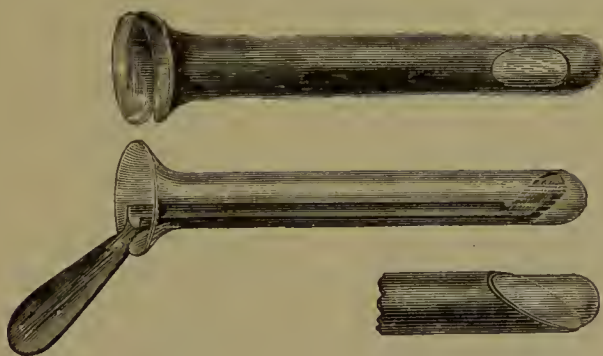
Of the endoscopes proper, by means of which the deeper portions of the urethra and the anterior of the bladder may be brought into view, the two best are those of Grünfeld and Skene. The patient is put in the dorsal position for examination, and the parts are illumined by means of a head-mirror and lamp as when the various other specula are used. Each of these instruments consists of a short straight tube closed at its inner, and flaring at its outer, end. That of Grünfeld<sup>1</sup> is of metal, blackened on the inside and closed at the inner end by a plain glass disk set obliquely, in order that the rays of light may penetrate it instead of being partially reflected back. Skene's instrument (Fig. 143) has three parts: the endoscope proper, which is merely a diminutive glass test-tube; a speculum of hard rubber, into which the test-tube fits, and provided with a fenester through which applications may be made to the urethral wall after the endoscope is withdrawn; and a small mirror like a laryngoscope, which is set at an angle of a hundred degrees upon a stem of thin silver plate transversely curved so as to fit the wall of the tube and occupy the least possible space.

The urethra should not be previously dilated for endoscopic examination of the urethra itself or of the vesical neck, since dilatation so alters the blood-supply of the parts as to make the picture obtained no longer reliable. It is possible that cocaine will often be of great service in rendering the examination painless, but the tendency of this drug to produce local anæmia, as is observed to follow its use in the nasal

<sup>1</sup> *Wiener Allgem. Zeitung*, 1874, p. 98.

passages, must be borne in mind. A small quantity of a 4 per cent. solution may be injected into the urethra by means of an ordinary dropper one or two minutes before the examination. Urethroscopy is by no means to be regarded as a *dernier ressort* to which refuge is to be had only in difficult and obscure cases. It is an extremely simple procedure, and has unquestionably, in experienced hands, given results

FIG. 143.



Skene's Endoscope.

which make its universal acceptance as a part of routine examination very desirable. As an instance of its usefulness may be cited the actual inspection by Skene of vesico-urethral fissure, a lesion which had hitherto been merely presumed, never seen; also the condition of hyperæmia of the vesical neck as seen and described by the author in a number of cases which would otherwise have been treated as neuroses.

The endoscope, however, does not disclose every pathological condition: it is notably deficient in differentiating certain new growths and granulations of the deeper portions of the urethra; and this deficiency has led Emmet to prefer an operative procedure for purposes of urethral inspection—*i. e.* division of the urethro-vaginal septum from a point a short distance behind the meatus nearly to the sphincter vesicæ.<sup>1</sup> Emmet has devised for this operation a pair of buttonhole scissors, one blade of which is passed into the urethral canal: the incision can, however, easily be made with the knife upon a No. 12 block-tin sound, which is first carried into the bladder. Great care must be taken not to carry the incision too near to the vesical sphincter, in order that the latter may escape all injury. If it is desired to keep the wound open, the urethral and vaginal mucous membranes should be united by a continuous cat-gut suture along the whole circumference of the incision, and any urinary deposit prevented by daily vaginal douches of hot water. If immediate closure be desired, interrupted wire sutures are to be passed as in ordinary vesico-vaginal fistulae, except that the edges of the urethral

<sup>1</sup> *Principles and Practice of Gynecology.*

mucosa are to be included in the sutures in order to secure perfect apposition. In either case the patient is to be kept in bed for ten days after the operation, and allowed to empty the bladder herself as often as she desires. Emmet considers this manœuvre absolutely safe and requiring no unusual dexterity on the part of the operator. In certain cases where the urethra is thickened or dilated near the vesical orifice, or when great vesical irritability or perhaps intractable cystitis leads to strong suspicion of an urethral polyp which the endoscope fails to discover, the buttonhole operation just described offers a justifiable and efficient means of urethral exploration.

There remain two exceedingly valuable methods of vesical exploration, which are, nevertheless, because of their operative nature, to be reserved for serious and obscure cases: these are dilatation of the urethra and vaginal cystotomy.

*Artificial Dilatation of the Urethra.*—As a means of diagnosis dilatation has been in use for only the past fifteen years. The dilatability of the canal has, however, long been known, and also employed for operative purposes: even Celsus advised the removal of calculi through the urethra, and this procedure was revived by Marianus Sanctus and Franco in the early part of the sixteenth century. It made, however, but little progress until the first half of the present century, when Anthony Cooper performed gradual dilatation by means of compressed sponge in five cases for the removal of vesical calculi. Huguier adopted the same method in 1860, but it was not until ten years later that the process of rapid dilatation began to be employed. At about this time the idea seems to have originated independently with several surgeons, notably Simonin of Nancy, Paul Hyford, Christopher Heath, Robiquet, and Simon of Heidelberg. Simonin did dilatation in five cases, enlarging the urethra to a diameter of 2.5 cm. and more without resulting incontinence. Hyford in a careful monograph published in 1872 advised rapid dilatation up to a diameter of 1.3 cm. for the removal of calculi, deeming it unsafe to exceed this limit; he was probably the first to perform this operation. Heath dilated with the finger, and still prefers the same method. Robiquet<sup>1</sup> used the dilator of Dolbeau, and did not consider a diameter of 3 cm. beyond the limits of safety.

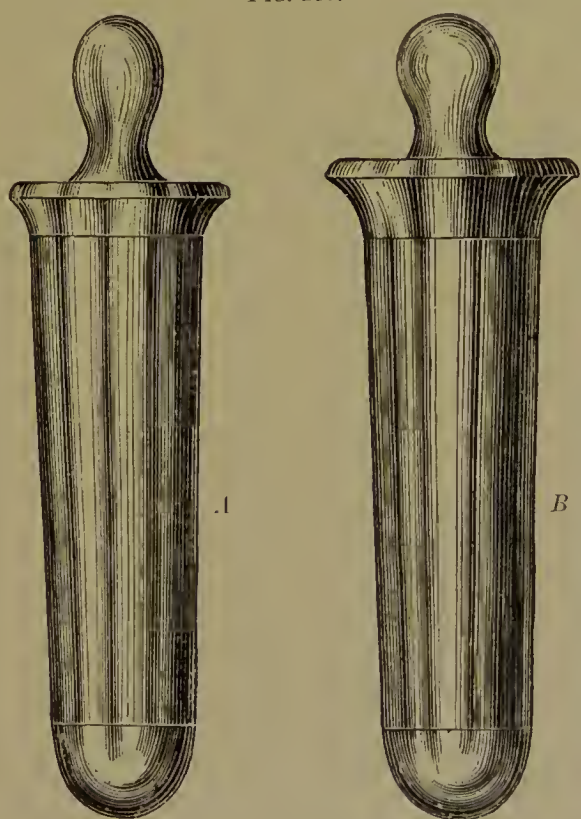
It is, however, to Simon<sup>2</sup> that we are chiefly indebted for this procedure as it is now employed. He was the first to make it available to the profession, to indicate precisely the limits to which the dilatation could be safely carried, and the conditions which demanded its use. His method still remains the one most universally employed, easiest of application, most satisfactory in its results, and most devoid of danger.

<sup>1</sup> *Union médicale*, 3me Série. 24, 890.

<sup>2</sup> H. Wildt: *Arch. f. klin. Chirurg.*, 1875, S. 167.

It is carried out as follows: Since the meatus is the narrowest part of the urethra, three small incisions are first made in its border, two above and somewhat laterally to a depth of 2.5 mm., and one below to a depth of 5 mm. The author, however, has usually dispensed with the latter, because of the troublesome hemorrhage which sometimes results. These incisions prevent subsequent laceration and allow the finger to be passed deeper into the bladder. Dilatation is then effected by means of a set of seven slightly tapering hard-rubber plugs (Fig. 144),

FIG. 144.



Simon's Urethral Dilators.

the smallest of which has a diameter of 7 mm., the largest of 20 mm. at its base. Each of these plugs consists of an outer cylinder and an obturator, the latter being merely to give a rounded end to the cylinder for purposes of insertion, and easily withdrawn without the cylinder if it be desired to leave the latter in place as a speculum. These plugs are passed rapidly, one after the other, into the urethra, each being allowed to remain a few seconds, until the desired degree of dilatation is reached. Up to the age of fifteen years the limit of dilatation should be from 1.5 to 1.8 cm., according to the age, while at twenty years and above it may be safely carried to a diameter of 2 cm. This



readily admits an average index finger, which has a diameter of about 1.8 cm. at its base. After withdrawing the last plug the index finger of the left hand, or in young girls the little finger, is carried through the urethra into the bladder; and if the index finger is used, much may be gained by introducing the middle finger into the vagina to assist in palpation of the vesico-vaginal septum: the right hand should be used for conjoint manipulation, as in examinations of the uterus. Slight hemorrhages sometimes occur from ruptures of the urethral membrane, and severe ones are not unknown, although of very rare occurrence when the meatus is first incised and the prescribed limits are not exceeded: they are to be stilled by topical hæmostatic applications, or, if severe, by tamponing the vagina so as to compress the urethra, or possibly, if at the meatus, by a deep suture. Incontinence of urine followed in some of Simon's cases for a few hours after the operation, and is the consequence most generally feared. It is indeed not to be wondered at that permanent incontinence has sometimes resulted from artificial dilatation, when we consider the various methods which have been and are still practised, most of which are inexact and calculated to produce laceration and overstretching of the sphincter. Fingers, too, vary much in size, and if the index finger were to be taken indiscriminately as the limit of dilatation, no doubt some operators would have an undue proportion of unfortunate results. Incontinence is of very rare occurrence when the precautions recommended by Simon are faithfully observed and the index finger does not exceed the average size. Simon in 1875 had dilated over sixty urethrae without seeing a case of permanent incontinence result. Noeggerath<sup>1</sup> in a series of over seventy cases experienced it but twice. By means of digital palpation the whole vesical interior, except that portion of the anterior vesical wall directly behind the pubes, can be thoroughly explored. The indications for urethral dilatation will be specified in treating of the various urethral and vesical diseases.

*Vaginal Cystotomy.*—This operation renders every portion of the vesical interior accessible to the index finger: its disadvantages are, on the other hand, sufficiently obvious. To make the incision the patient should be etherized and placed on the side in the usual Sims position. A curved sound is then passed into the bladder, its beak pressed against the vesico-vaginal septum in the median line a short distance behind the vesical orifice, and held by an assistant in this position. The mucous membrane covering the beak is then steadied with a tenaculum, and with the knife or scissors the septum is cut through upon the sound, especial care being taken to divide the vesical and vaginal membranes at corresponding points. The incision should be longitudinal, and for purposes of diagnosis need not exceed 2 cm. in length. In rare instances this

<sup>1</sup> *Am. Journ. Obst.*, May, 1875.

may, if necessary, be subsequently enlarged, so as to extend nearly to the cervix uteri, and a transverse cut 3–4 cm. long may also be made at its cervical extremity. Through the T-shaped opening thus made the whole vesical coat may be gradually drawn down by tenacula and inverted through the vagina, so as to be open to direct inspection and operation. Cystotomy as a means of diagnosis would hardly be indicated except in cases of suspected vesical tumor or encysted calculus, where the opening would also serve for purposes of operation.

*Sounding the Ureters.*—A diagnostic method may perhaps be spoken of here which was first introduced by G. Simon, but which has of late been raised by Pawlik<sup>1</sup> to a considerable degree of importance. Simon found that it was possible in the female to pass a sound or catheter into the pelvis of either kidney by using the index finger in the bladder as a guide to the mouths of the ureters, of which, however, only the slight elevation upon which they are situated can be felt. A more detailed description of this somewhat difficult method of Simon may be found in Winckel.<sup>2</sup> Pawlik has more recently accomplished the same feat in more than 150 cases by a simpler method which does not require previous dilatation of the urethra. Upon the vaginal surface of the vesico-vaginal septum the boundaries of the trigonum are marked by furrows, two of which diverge from the vesical orifice toward the mouths of the ureters, where they are crossed by two other small furrows. With the patient in the knee-elbow position and the perineum well retracted, an especially-adapted catheter is passed through the urethra and along the line indicated by one or the other furrow until it engages in the mouth of the ureter. This does not always succeed at the first attempt, but rarely fails of ultimate success if the parts are in normal position. Owing to the somewhat circuitous course of the ureters any deep sounding can hardly be devoid of danger unless experience has already been gained by considerable practice upon the cadaver. By either of these methods urine may be collected from either kidney, and thus in cases where one kidney is diseased and its removal proposed the integrity of the other may be ascertained. Pawlik considers the method of especial value for exactly localizing the ureters in laparotomy and extirpation of the uterus. In one case also the procedure gave immediate relief from an attack of renal colic.

## II. MALFORMATIONS OF THE URETHRA, BLADDER, AND URETERS.

### 1. EMBRYOLOGY.

At a very early period of foetal life, toward the end of the first month, before the closure of the abdominal wall, and at a time when

<sup>1</sup> *Arch. f. Gynecol.*, No. 49.

<sup>2</sup> In *Billroth's Handbuch d. Frauenkrankheiten*.

the intestinal canal is in its most primitive condition, a small hollow sprout or process is formed upon the ventral aspect of the caudal extremity of this canal, which is called the allantois. This process rapidly increases in length, and as the abdominal walls close in around the umbilical opening, the allantois, which is now a long hollow tube emptying into the lower end of the intestinal canal, also becomes included in the umbilical cord, and is thus divided into an external and an internal portion. The latter gradually dilates to form the urinary bladder, and probably also participates in the formation of the urethra.

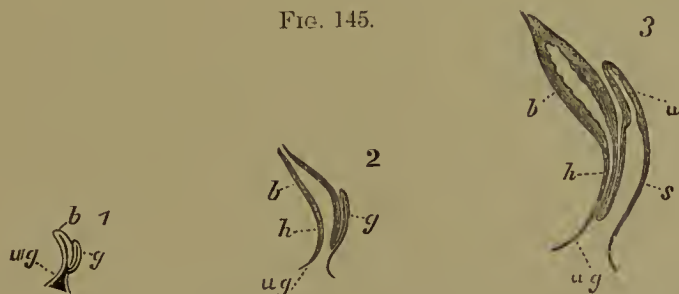
Meanwhile, the secretory part of the urinary apparatus has been undergoing an important succession of changes. During the first few weeks the function of the future kidney has been temporarily performed by the Wolffian bodies or primordial kidneys, two glandular structures situated on each side of the vertebral column and having excretory ducts, the Wolffian canals, which open into the lower portion of the allantois near its junction with the intestine. From each of these Wolffian canals a sprout is then formed which rapidly develops into permanent kidney and ureter, the latter emptying at first into the Wolffian canal, but subsequently separating from it entirely and entering the allantois by an opening situated slightly above that of the Wolffian canal. When this stage has been reached the Wolffian bodies and canals have no further significance in the female economy, and are to be found in the fully-developed fœtus only as the so-called organ of Rosenmüller—a remnant of an embryonic structure.

Besides the Wolffian canals and the ureters, the lower portion of the allantois receives also two other ducts, situated still nearer the intestine than the Wolffian canals, and called the ducts of Müller. These are formed independently of the Wolffian bodies or canals, and their lower portions are destined by their subsequent confluence to become the uterus and vagina.

It is thus seen that early in fœtal life the primitive urogenital systems and digestive tract all empty into a common cavity, the cloaca. This cavity has at first only one external opening, but about the middle of the third month a division takes place, both in the cavity and outlet, by means of which the future rectum and anus become separated from the common receptacle of the urogenital systems, and the latter with its outlet is now called the urogenital sinus. This sinus has an extremely important bearing upon the origin of urethral malformations, as has also the relative rapidity of development of the genital and urinary systems as compared with each other. In a fœtus of three months this sinus has a depth of about 2.5 mm., and the ducts of Müller are about equal in size to the now spindle-shaped dilatation of the allantois which forms the bladder (Fig. 145, 1). A month later (Fig. 145, 2) the sinus urogenitalis has still the same depth, while the uterus and bladder have

both increased in size, the latter, however, much more rapidly than the former, so that the sinus urogenitalis seems now to be the prolongation of the bladder, while the utero-vaginal canal appears rather as an appendix. It is only at the fifth or sixth month that this relation is materially changed (Fig. 145, 3), the utero-vaginal canal having now taken on a rapid development and appearing henceforth as the real prolongation

FIG. 145.



Sinus Urogenitalis and its Appendages, from Human Embryos (in life-size): 1, from a three months' fetus; 2, from a four months'; 3, from a six months': *b*, bladder; *h*, urethra; *ug*, sinus urogenitalis; *g*, genital canal, common rudiment of vagina and uterus; *s*, vagina; *u*, uterus (Kölliker).

of the urogenital sinus, the depth of which has also somewhat increased. We shall hereafter see that these facts will explain some of those malformations which have given rise to the greatest confusion in diagnosis.

The process by which the female urethra is developed seems to be still unknown. That it begins at a relatively late period would seem to be the natural deduction from the fact that in most cases of persistence of the urogenital sinus, even after the latter has become the prolongation of the vagina, all trace of the urethra and vesical sphincter is wanting. Rose<sup>1</sup> believes that the urethra is developed by the union of three separate parts—*i. e.* an inner or vesical portion; an external portion, or pitting-in of the vestibular mucosa; and a middle portion, which develops as a process from the anterior intestinal wall. To say nothing of the difficulty of conceiving such a development, except at a very early period, when, as a matter of fact, all trace of the urethra is still wanting, we should expect to meet with traces of this vestibular portion in those cases where the development of the middle and vesical portions has been arrested; *i. e.* in cases of persistence of the urogenital sinus—a variety of malformation which has as yet failed to appear.

## 2. MALFORMATIONS OF THE URETHRA.

(a) *Irregularities of position and direction* are rarely found apart from other abnormalities of the neighboring organs; and this is also true in

<sup>1</sup> *Monats. für Geburtskunde*, Bd. xxvi. S. 244.



general of all the other urethral malformations which will hereafter be described.

In cases of atresia or imperfect development of the vagina the situation of the urethral meatus is often extremely low, so that a catheter has to be directed at first upward toward the symphysis before it can be carried directly backward into the bladder. Again, the meatus may be situated unusually high, whereby the natural curve of the urethra is greatly exaggerated: in such a case the stream of urine may be directed upward instead of downward, and considerable precaution is necessary in catheterization. Malgaigne tells of being called upon to catheterize a woman who had had retention for three days succeeding childbirth, and of the great difficulty he experienced in introducing a catheter until he was informed by the patient that neither she nor a daughter of hers had ever been able to urinate in the ordinary position, since the direction of the stream was almost directly upward.

Instead of being in its normal position, the meatus may be situated above the clitoris—a malformation which Gosselin claims to have been frequently able to demonstrate to his pupils. This anomaly is attended with no inconvenience on the part of the patient, although it might give rise to considerable confusion in attempts at catheterization. It has no further embryological significance than simply as indicating an unusually low formation of the genital tubercle from which the clitoris is afterward developed—a process which is quite independent of the development of the internal genito-urinary system.

(b) A *double urethra* has been observed in only two cases. In one of these<sup>1</sup> the urethra began at the vesical orifice as a single canal, and then divided, 0.3 cm. from its origin, into two channels, which pursued a nearly parallel course and opened about 0.3 cm. apart in about the usual situation of the meatus. In the second case there were also two openings in the vestibulum, one of which led directly into the bladder through an urethra of ordinary length, while the other ended in a blind pouch; it should be stated, however, in regard to this second case, that the pouch seems quite likely to have been an artificial production, since the patient, who was an adult, had been subjected immediately after birth to an operation for retention of urine. The explanation of these cases of duplexity seems exceedingly difficult, now that the theory of Remak in regard to the double origin of the allantois has proved to be incorrect.<sup>2</sup>

(c) *Hypospadias* in the female is a term under which several widely-different conditions have been described. Most German authorities extend its application to those not exceedingly rare cases where there

<sup>1</sup> Fürst: *Arch. f. Gynäkol.*, 1876, Bd. x. S. 161.

<sup>2</sup> Vide Kölliker: *Entwickelungs Gesch. d. Mensch. u. Thiersch. Organismus*; also His: *Anatomic Menschlicher Embryonen*.

is a total absence of the urethra—cases which we shall soon consider as persistence of the urogenital sinus. Strictly speaking, hypospadias is simply a defect of the inferior wall of the urethral canal, and much confusion will be avoided if the use of the term is restricted to this variety of malformation. Several cases of this nature have been described, and they all present the common feature of a more or less symmetrical trough or groove which occupies the usual position of the urethral canal. This defect does not necessarily involve the urethra throughout its whole extent: it may be limited to the anterior portion, while the posterior half of the canal retains its normal perfection of form and function. Usually, however, the sphincter vesicæ is also imperfectly or not at all developed, and there is incontinence of urine. This is always the case when the defect involves the whole length of the canal, the vesical orifice being then represented simply by a rounded or oval opening, usually transverse, through which one or two fingers can easily be introduced into the bladder. The clitoris may also be cleft, and the furrow may then be prolonged from the meatus upward over the vestibulum to the anterior margin of the symphysis. In a case reported by Heppner<sup>1</sup> the posterior half of the urethra was well developed, while the anterior portion was represented only by an irregular furrow running between several small mucous prominences which seemed to be remnants of a former urethra: the etiology of this case is, however, doubtful, since the patient had been subjected in early childhood to an operation for vesical calculus. In our present state of ignorance in regard to the development of the urethra it is impossible to say whether these cases of hypospadias are to be interpreted as the result of an arrest of development or as a vice of development. Nunez<sup>2</sup> accepts the latter explanation, according to which the urethra is to be regarded as having been at first fully developed, with subsequent reabsorption of its inferior wall.

(d) The only known case of *epispadias* in the female, apart from extrophy of the bladder, has been recently observed and described by Guyon.<sup>3</sup> This writer defines the condition as “a total or partial defect of the anterior urethral wall, with ectopia of the urethral canal.” Guyon’s case presented in the vestibular region a small red tumor which could be pushed back through an opening into the bladder, and which was evidently the prolapsed vesical mucosa. This opening was shaped like a horseshoe, the convexity being directed upward and the base resting upon the anterior vaginal wall, from which it was separated by a thin mucous membrane. This latter was evidently the floor of the urethra, and extended backward a distance of 1.5 cm. before joining the

<sup>1</sup> *Monats. f. Geburtsk.*, 1865.

<sup>2</sup> “Vices de Conformation de l’Urèthre chez la Femme,” *Thèse*.

<sup>3</sup> Nunez: *op. cit.*

vesical mucosa. It is hardly necessary to say that there was absolute incontinence of urine. The case differs from one of subpubic vesical fissure in the presence of this urethral floor.

(e) *Congenital atresia urethræ* may have a widely varying influence upon the life of the individual according as the urine, at the time when the stricture forms, is able to find another mode of exit from the bladder. If no such opening of derivation is formed, the urinary passages above the seat of obstruction become gradually distended as a result of the constant secretion of urine which undoubtedly takes place during the later months of foetal life, and the foetus is rendered unviable, or the distension may even be so great as to form a mechanical obstruction to delivery. If, however, the urine finds exit through another channel—and this channel, leaving out of consideration the origin of vesical extrophy, is usually a pervious urachus—the life of the individual may be indefinitely prolonged. The urethral obstruction is usually in the form of a membranous wall, which may cross the canal in a transverse, more often decidedly oblique, direction, and may be readily perforated with a bistoury. More rarely, a small portion of the urethra is transformed into a solid cylinder. The obstruction may be situated anywhere from the meatus to the vesical orifice. A case was observed by Bar<sup>1</sup> where a newly-born child presented such a projection at the vulva, as a result of the distension by urine of a membranous wall covering the urethral meatus, that the child was supposed at first to be a male. At the umbilicus the constant escape of urine and the resulting irritation produces a condition of things which might at first give rise to difficulty in diagnosis. The mucous membrane at the mouth of the fistula becomes in time greatly hypertrophied in the form of bright-red warty growths which present much the appearance of a cock's comb; or, as in the case of Petit, there may be a veritable tumor which has to be raised before the fistulous opening is disclosed.

A slighter degree of congenital stricture seems to be occasionally met with in young girls in the form of a narrowing of the meatus. These children are said to suffer from irritable bladder, and relief is usually afforded by a moderate dilatation of the constricted portion.

(f) *Persistence of the Urogenital Sinus*.—In using this expression as describing a variety of malformation it is not to be understood that the embryonic canal called the urogenital sinus normally disappears. On the contrary, as we have already seen, this canal seems to increase in length with the further development of the genital and urinary systems,<sup>2</sup> so that in the sixth month of foetal life we find it considerably larger than at the fourth month. Hence it may be said that the urogenital canal always persists as a permanent structure, but from the fact that in the event of a full normal development of all the

<sup>1</sup> Nunez: *op. cit.*

<sup>2</sup> See Fig. 145, from Kölliker.

pelvic organs this sinus becomes the lower part of the vagina, while in cases of imperfect genito-urinary development it usually retains its fetal character, it seems proper to speak of persistence of the urogenital canal as a malformation.

The development of the genital and that of the urinary system seem to go hand in hand, so that when an arrest of development occurs in either, the other rarely reaches its normal perfection. This fact led Heppner to enunciate the law that absence of the urethra is always accompanied by rudimentary organs of generation. We have already seen that during the first few months of fetal life the bladder develops much more rapidly than the uterus and vagina, and that until about the fifth month the urogenital sinus—or, as it may also be called, the urogenital canal—appears to be a direct prolongation of the bladder. Later, this relation is changed: the uterus and vagina take on a rapid development; the urethra begins also to form; and the urogenital canal appears henceforth as a prolongation of the vagina, finally as a part of the vagina itself.

These facts are of great importance in interpreting the widely-varying conditions which may result from an arrest of development at different periods of intra-uterine life. To begin at a very early period, the development of the pelvic organs may go no farther than the formation of the cloaca, with or without an external opening. Such a condition has been observed in the newly-born, but has but very little present interest, since such a fetus is not viable. If further development is arrested at any time during the first four or five months of fetal life, after the formation of the rectal cloison, but one opening will appear between the clitoris and anus, and this will lead directly into the bladder. The uterus and vagina will be found to be more or less rudimentary, and the vagina may be represented merely by a blind pouch extending partway from the uterus toward the vesical opening, or it may open into the latter by an orifice which will vary in size according to the earlier or later period at which further development ceased. In other words, the condition represents a urogenital canal which seems to be the direct continuation of the bladder; the organs of generation are still rudimentary, and there is no indication as yet of the urethra or sphincter vesicæ. Such a case has been recently reported by Post<sup>1</sup> in addition to the few other examples of this rare anomaly which have been recorded. Here there was regular menstruation through an opening which could not be discovered; and indeed the woman had borne one child, showing that the uterus and ovaries were at least tolerably well developed. The external urogenital orifice was provided with a sphincter muscle—a modification probably of the musculus bulbo-cavernosus—and coitus was effected through this sphincter. The woman

<sup>1</sup> *Am. Journal of Obst.*, 1885, vol. xviii. p. 785.



suffered from incontinence when standing. A remarkable case of similar character is also reported by Dyrenfurth<sup>1</sup> of an individual who lived for sixty-eight years as a male, and in whom a post-mortem examination discovered ovaries and a rudimentary uterus. This woman did not menstruate, and had a penis-like clitoris 8 cm. in length, but without any trace of a penile urethra. At the base of the clitoris was an opening through which a sound could be passed into the bladder, and at the autopsy an incision made through the base of the bladder into the rudimentary vagina showed that a sound passed through the incision would also emerge at the external opening—an instance, therefore, of persistence of the urogenital canal, into which a rudimentary vagina opened by a small orifice. Such a case would usually be mistaken for hypospadias in the male, and the only possible means of diagnosis during life would be the detection of the vaginal opening into the urogenital canal, together with the absence of a testicular body in either of the labia majora or the inguinal rings. Incontinence is not usually present in these forms of early arrest of development, unless the external sphincter with which the urogenital canal is commonly provided has been dilated by repeated coitus.

A somewhat more common variety of this malformation is that which is usually described as total absence of the urethra or as a form of hypospadias. The vagina and uterus are tolerably well developed, and the hymen is not wanting, as in the cases hitherto described. There is, however, a total absence of the urethra—neither a fossa at the usual situation of the meatus, nor the slightest indication of a groove, such as is found in true cases of hypospadias. About 3–4 cm. up upon the anterior vaginal wall is a simple rounded opening, without a vestige of cicatricial tissue and without a sphincter, through which one or two fingers can be passed without difficulty into the bladder. These patients usually give a history of incontinence dating from early childhood.

It seems most natural to interpret these malformations as a partial arrest of development dating from a period when the urogenital canal has already taken on the character of a vaginal outlet, but the urethra is still unformed.

Between those forms which date from an early period of foetal life and those last described it is possible to conceive of many varieties, although examples of such are to be found only here and there recorded. In two instances the urogenital canal divided a short distance from its mouth into two canals, a posterior vaginal and an anterior or partially developed urethra, of which, however, the sphincter was sufficiently well developed to prevent incontinence. In both of these cases the urogenital canal was scarcely larger than a quill. Again, in place of the vagina a blind pouch may be found, 3–7 cm. in depth, with a short

<sup>1</sup> *Centralb. f. Gynäkol.*, 1884, Bd. viii. S. 385.

imperfectly-developed urethra opening into its anterior wall, or with merely a fistula-like opening at the usual situation of the vesical orifice.

The DIAGNOSIS of urethral malformations will usually demand a careful exploration of the various canals by means of sound and finger, and when possible by the aid of a speculum. It is perhaps the determination of sex in children which will present the greatest difficulty; and such a determination is not always possible even after the patient has reached an age when we are assisted by external habitus, sexual inclination, and the like. To distinguish between a hypospadiæ male and persistence of the urogenital canal in the female we shall be aided by palpation of the labia majora in search of testicles, and by palpation of the uterine region through the rectum, or, possibly, through the urogenital canal. Our chief effort, however, must be to determine whether this canal is single—*i. e.* the prostatic portion of the male urethra—or whether it presents in some part of its course a second opening through which a probe can be passed into a rudimentary vagina. When such a division of the urogenital canal exists, it is said to afford infallible proof that the individual belongs to the female sex, although it is to be borne in mind that one or both ureters might possibly open in this situation. The presence of a testicular body in one or both labia is only of relative value as an aid in diagnosis, since an ovary may thus descend through an inguinal hernia. Persistence of the urogenital canal is also to be distinguished from atresia vaginæ with subsequent dilatation of the urethra as a result of coitus; in the former the sphincteric orifice presents an appearance quite different from that of a patulous urethra, and the perineum has a median raphé, without trace of a vaginal orifice or of cicatricial tissue.

Persistence of the urogenital canal has also been simulated in one instance by a growing together of the lower portion of the labia majora, so as to cover the vaginal orifice and form but a single opening between clitoris and anus, through which a sound passed directly into the bladder: to recognize such a condition it is only necessary to remember that it may occur.

Urethra duplex could only be confounded with an abnormal situation of a ureter, such as will be hereafter described, and here the constant dripping of urine from the supposed urethra would disclose the error.

TREATMENT.—Cases of congenital atresia urethræ with an umbilical fistula have been completely cured by operative perforation of the urethra and ligature of the umbilical excrescence. In two cases of complete obliteration of the canal<sup>1</sup> the bladder was perforated in the sub-

<sup>1</sup> One of Cabral, 1591 (*vide* Nunez: *op. cit.*); the other reported by Middleton, *Am. Journ. Med. Sci.*, 1868, Jan., p. 69.

pubic region by means of a bistoury, and this artificial passage kept open by the temporary insertion of a catheter: no alarming hemorrhage appears to have resulted from the operation, and the result was permanently successful in each case.

Hypospadias may also be treated by operative interference, with a prospect of at least greatly improving the patient's condition. Leberdeff<sup>1</sup> in a woman of twenty-three suffering from absolute incontinence, where the trough was deep and the walls high and prominent, simply freshened the edges of the latter and united them by ten silver sutures over a catheter *in situ*: the first operation was successful, and the patient could retain her urine for an hour in a sitting posture. Mörike<sup>2</sup> operated somewhat differently, the conditions also being somewhat different. Here the groove was very shallow, with scarcely appreciable walls; incontinence was present since birth, and no trace of a vesical sphincter. Mörike freshened the margins of the groove, and then made two lateral incisions through the vesico-vaginal septum, extending upward and outward from each angle of the congenital fistula, so as to form a vesical flap, which was then drawn down over the groove and united to its freshened margins. This operation resulted, after a second trial, in a good urethra and perfect continence, in spite of the absence of any regular vesical sphincter. This is to be regarded as an exceptionally fortunate result, but in any case it may be hoped at least to so lengthen the urethra that a receptaculum can be more easily fitted and worn.

In those similar cases of persistence of the urogenital canal where the vagina is tolerably well developed and all trace of urethra is wanting an attempt may also be made to build an artificial urethra by removing a strip of mucous membrane from each side of the usual course of the urethra along the anterior vaginal wall, and uniting these freshened surfaces by silver sutures over a catheter. The operation has, however, been performed so rarely that it is still to be regarded as a curiosity in surgery, and any further details may here be omitted. (For a full account of the difficulties attending such a procedure the reader is referred to the chapter in Emmet's *Gynecology* on urethral fistula, where a similar operation upon a case of hypospadias is fully described.) If it does not seem advisable to attempt such an operation, it is best in such cases to rely simply upon artificial appliances for collecting the urine, such as are used in ordinary cases of vesico-vaginal fistula. No advantage is to be gained by any attempt to diminish the size of the fistula; on the contrary, a transverse slit has proved to be better adapted for purposes of retention than a small round opening. Heppner<sup>3</sup> enabled his patient to retain her urine indefinitely by the use of a

<sup>1</sup> *Arch. f. Gynäkol.*, 1880, Bd. xvi. S. 290.

<sup>2</sup> *Berliner klin. Woch.*, 1880, Bd. xvii. S. 334.

<sup>3</sup> *Loc. cit.*

vaginal pad, held in position like a Cutter pessary, and fitted so as to compress the posterior lip of the fistula against the symphysis.

### 3. MALFORMATIONS OF THE BLADDER.

The section of vesical pathology may be passed over all the more lightly because, in addition to the great variety of vesical malformations in the female, the only one of these which is of any clinical importance—viz. vesical fissure—belongs rather in the domain of the general surgeon than in that of the gynecologist.

(a) The bladder may be entirely absent, although such cases are of the greatest rarity, and the only one to be met with in recent literature is that of Oliver.<sup>1</sup> Here the urethra ended about 4 cm. from the meatus as a blind pouch capable of holding about 5 cc. of urine; both ureters were inserted into this pouch, the right being impervious, while the left was greatly dilated and capable of serving as a partial reservoir. There seems to have been no further trace of the bladder, and hence the probable supposition that the case was really one of congenital origin rather than of vesical atrophy as a result of disuse.

(b) Cases of *double bladder* appear to be diminishing in frequency with the advance of pathological anatomy; and this fact necessarily throws considerable doubt upon the value of many cases which have been reported here and there by early writers. Molinetti, for instance, speaks of a woman with five bladders, each with separate ureter, and all opening into a single common urethra—a case more probably of sacculated bladder. (*Vide Vesical Hypertrophy.*) Blasius also describes a case of total division of the bladder into two halves, as found at the autopsy of an adult male. Other examples of this anomaly are said to have been frequently observed in the newly-born, as in the case of Schatz,<sup>2</sup> where in addition to a double bladder there were also double uterus and vagina, with a congenital vesico-vaginal fistula between each half of the bladder and its corresponding vagina. Cases of a more incomplete division of the bladder do not appear to be quite so rare. This division is usually antero-posterior, either as a slight furrow extending over the summit of the organ, or in the form of a septum which may in turn either be partial or complete, so that there is absolutely no communication between the two lateral compartments. An apparent transverse division of the bladder into two parts may be simulated by a dilatation of the nuchus so as to form a large cyst which is connected by a small opening with the vesical cavity. In all cases of apparent duplicity of the bladder the possibility of enormous pathological cysts and sacculæ must be borne in mind, and even the post-mortem diagnosis of vesica bilocularis must be made with care.

<sup>1</sup> *Lancet*, 1879, vol. ii. p. 829.

<sup>2</sup> *Arch. für Gynäkol.*, 1872, iii. S. 304.



(c) *Vesical fissure, or partial defect of the anterior vesical and abdominal walls*, is by far the most common vesical malformation, although the proportion of females thus affected is much smaller than that of males. Among the numerous theories which have been advanced in explanation of this anomaly, the one which still has the greatest number of supporters is that originally put forth by Duncan, according to which the neck of the allantois is supposed to have become impervious at an early period of intra-uterine life, before the closure of the abdominal walls; hence retention of urine, rupture of the allantois, and adherence of its edges to those of the abdominal fissure. Rose, on the contrary, supposes every case of vesical fissure to have been originally a pervious urachus—a theory, however, which is hardly reconcilable with the occasional normal situation of the umbilicus some distance above the fissure. Klebs regards the relative frequency of other fissures in combination with that of the bladder, such as hare-lip, epispadias, spina bifida, etc., as proof that some more general factor is needed in the explanation of this anomaly, possibly an affection of the amnion.

The extent of the fissure may vary from a very small opening, not larger than the finger, to an almost total defect of the whole anterior urachio-vesical wall from the umbilicus to the neck of the uterus. These extreme cases of vesical fissure are generally termed extrophy of the bladder, since the whole remaining portion of the viscus is usually inverted or prolapsed through the vesico-abdominal opening. A small fissure may be situated entirely below the symphysis, involving only the vestibular region, or it may lie just above the pubes, or still higher, in the region of the umbilicus. The fissure usually appears as a small circular opening, the edges of which are occasionally cicatricial, and through which a bright-red mucous surface, the posterior vesical wall, is visible, or possibly prolapsed in the form of a small sensitive tumor. The external skin is directly continuous at the margin of the opening with the vesical mucosa.

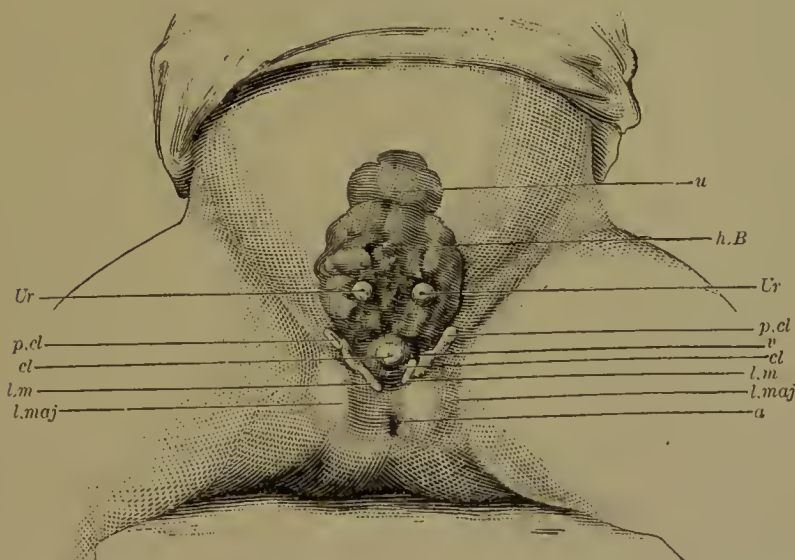
The form of vesical fissure should not be confounded with simple fissure of the abdominal wall, through which the anterior surface of the normal bladder may partially protrude.

When there is total defect of the anterior vesical wall the relation of the parts is often somewhat confusing, and the accompanying illustration, taken from the report of a case observed by Merman,<sup>1</sup> will serve as a type of the appearance usually presented by such a malformation. Above is a large tumor which represents the everted bladder (*h.B*) with its two ureters (*Ur, Ur*), and below is the anal opening (*a*), between which and the umbilicus the distance, as in all these cases, is much less than normal. Just above the anus is a second opening (*c*), supposed by Merman, on account of a small circular fold at its orifice resembling a

<sup>1</sup> *Arch. f. Gynäkol.*, 1885, xxvi. S. 143.

hymen, to be the vagina, but possibly the cervix uteri, since in many of these cases the vagina is also to a great extent involved in the fissure, and by lifting the vesical tumor the neck of the uterus is often brought directly into view. On each side of the vaginal opening are the labia majora (*l.maj*) converging below, but widely separated above, where the

FIG. 146.



Ectopia of the Bladder and Epispadia in the Female: *u*, umbilicus; *Ur*, urethra; *h.B*, posterior wall of bladder; *cl*, clitoris; *l.m*, labia minora; *v*, vagina; *a*, anus; *l.maj*, labia majora; *p.cl*, prepuce of clitoris.

remains of the cleft clitoris are also visible. Here there is only a slight separation of the pubic bones, although this is usually much more extensive in cases of such extreme extrophy.

When the vesical extrophy is of long standing the vesical mucosa on the edges of the tumor is usually found to have become somewhat altered and thickened, so as to have more or less the character of epidermis, and nearly the whole vesical mucosa may in time undergo the same change. The ureters are not always visible, as in the above illustration, but are often concealed beneath the edges of the overlying tumor: they are often considerably dilated just behind their vesical orifices, and may be the seat of numerous calculi. The urethra is usually entirely lacking, or at least the urethral canal may be said to be always impervious. In rare instances there is a double uterus or vagina; the former has also been found rudimentary, although it is, as a rule, fully developed. There is always a greater or less degree of pubic diastasis, varying from 1 to 8 cm., the pubic bones being connected only by fibrous bands, so that the gait of the patient is often rendered extremely uncertain and tottering.

The SYMPTOMS of vesical fissure are not such as to necessarily endanger life, and such an individual may in rare instances reach a considerable age. If the fissure is small, the chief discomfort will be from the constant escape of urine and the resulting excoriation of the surrounding parts; these may also become thickly incrustated with urinary salts, and are always the seat of a constant burning and itching, which render the life of the patient miserable. In rare cases, however, a partial retention of urine is effected, either by a sphincteric action of the orifices of the dilated ureters or by a temporary plugging of the fissure by a partial protrusion of the posterior vesical wall. When the defect is more extensive, so as to permit of more or less complete vesical extrophy, the extreme sensitiveness of the vesical tumor becomes a still greater source of annoyance to the patient than the incontinence. In spite of the change in character which the exposed mucosa gradually undergoes, so as to resemble more and more the epidermis, it seems to remain extremely sensitive to the slightest contact of clothing or instruments. The tumor can always be easily replaced, but any apparatus for the purpose of keeping it reduced will soon become unendurable and have to be speedily abandoned. In some cases the mucous surface of the tumor undergoes a sort of polypoid hypertrophy, so as to present an uneven, nodulated surface, which bleeds easily and has much the appearance of a malignant new growth. Even extreme vesical extrophy does not prevent conception and subsequent childbirth.

#### 4. MALFORMATIONS OF THE URETERS.

It is not the purpose of the author to give here a detailed description of all the possible anomalies which the ureters may present, since the great majority of these are without the least clinical interest, and are discoverable only upon abdominal section. Such is the presence of a double ureter on one or both sides, a malformation so common that at least fifty examples of it are to be found in *Virchow's Archiv* for the past thirty-five years. Double ureters almost invariably proceed from a kidney which has two distinct pelves, and as a rule they unite into a single canal before reaching the bladder. In exceptional cases, however, the duplicity persists throughout their whole course, and two openings into the bladder are found a few millimeters apart in about the usual situation of the normal orifice, or one division of the double ureter may terminate below as a cul-de-sac, as in a case observed by Beach,<sup>1</sup> where such a pouch was found post-mortem filled with pus. Again, both kidney and ureter of one side may be entirely absent: an instance of this anomaly was recently reported by Cutler before the Boston Society for Medical Improvement, where the left kidney and

<sup>1</sup> *Brit. Med. Journ.*, 1874, i. p. 649.

ureter were absent, and the bladder presented no indication of an opening where the left ureter should have terminated; there was also no left renal artery. Rayer<sup>1</sup> remarks that the total absence of both kidneys has been observed several times in the fetus, and occasionally in the infant at birth: he mentions the case also of a girl of fourteen who had neither kidneys, ureters, nor bladder, but with an umbilical fistula from which a fluid resembling urine escaped: we are not informed, however, as to the termination of this fistulous tract, and the above case is hardly to be accepted as fully authentic. Congenital atresia of one or both ureters seems also extremely exceptional, although a case supposed to be of this nature is reported by Davis Colley:<sup>2</sup> A child of eighteen months presented at the meatus urinarius an apparent prolapse of the urethral mucosa; this was excised, and a subsequent autopsy showed that the tumor had been in reality a vesical prolapse, caused probably by atresia of the mouth of one of the ureters, and resulting in the protrusion of this region by the pressure of urine from above.

For the gynecologist, however, there is a variety of malformation of the ureters which, although extremely rare, may claim a position of considerable importance—where, namely, one or both ureters, instead of emptying into the bladder, open externally or into one of the other excretory canals. We have already seen that when the bladder is congenitally absent the ureters may open into the cul-de-sac which forms the inner termination of the urethra. Cases are said to have occurred also where, the bladder being absent, both ureters have been found opening into the rectum or vagina.<sup>3</sup> Phillips<sup>4</sup> mentions a case of congenital absence of the bladder in which the ureters opened through the abdominal parietes as two small pouches on each side of the suprapubic region. But even when the bladder and urethra are both normally developed, one or the other ureter may have an abnormal insertion which is productive of the same direful consequences which always attend absolute incontinence of urine, and which has been proved by the author to be susceptible to an operation that will afford complete relief. Only four cases of such a malformation appear to have been observed—one by Emmet, where a ureter opened into the vagina on a level with the cervix uteri,<sup>5</sup> and three where the mouth of the left ureter was found in the vestibulum near the meatus urinarius. Of these three, one was observed by Von Massari,<sup>6</sup> the ureter opening by a very minute orifice in a fold of the preputium clitoridis. Of the other two, one was seen and operated upon by the author;<sup>7</sup> the other was found by him in

<sup>1</sup> *Diseases of Kidneys*, 1841.

<sup>2</sup> *Lancet*, 1879, i. p. 372.

<sup>3</sup> *Todd's Cyclopædia of Anatomy*.

<sup>4</sup> Oliver: *Lancet*, 1879, ii. p. 829.

<sup>5</sup> *Principles and Practice of Gynecology*, 1880.

<sup>6</sup> *Berliner klin. Woch.*, 1879, xxix. S. 880.

<sup>7</sup> Vide author's pamphlet: *Malpositions of the Ureters*, Boston, 1876.



the records of the Boston City Hospital. These two cases were remarkably similar in every respect. Both were young women suffering from incontinence, in whom urine was found to escape drop by drop from a small orifice in the immediate neighborhood of the meatus urinarius. This external orifice was very minute, and in the author's case escaped for a long time the most careful observation: behind the orifice, however, the canal appeared to be of quite considerable calibre, and when a probe was introduced the ureter could be easily traced along the anterior vaginal wall to the left lateral cul-de-sac, passing directly over the site usually occupied by the vesical orifice of the left ureter, and separated from the vagina by only a thin septum. In neither case was any connection observable between the left ureter and bladder, either by the aid of a vesical sound or by the intravesical injection of milk. In the author's case the quantity of urine which escaped from the external orifice was much less than that passed *per urethram*—a fact strongly suggesting the possibility of a double left ureter, of which the other division opened as usual into the bladder; or there may have been a considerable difference in the size of the two kidneys. There was an extreme irritability of the bladder, so that the desire to micturate was felt every few moments, although the patient could retain her urine for about an hour.

TREATMENT.—Only two cases are on record where any operation for the relief of such a malformation has been attempted—*i. e.* the author's case and that of Emmet. The latter proposed to build an artificial channel from the abnormal vaginal orifice of the ureter to the point where it should normally have entered the bladder, and then, after perforating the bladder at this point and allowing the margins of the perforation to heal, to close in the whole by a vaginal flap, so as to shut off the uretero-vesical channel from the vagina. The first part of the operation was successfully performed in the same manner as an artificial urethra would be constructed: the completion was, however, unfortunately prevented by the death of the patient from an intercurrent pneumonia.

The operation conceived and successfully terminated by the author for the relief of his patient was as follows: The abnormal opening was at first supposed to be a fistula leading from the left ureter, since previous to etherization a probe could be passed only to a depth of  $2\frac{1}{2}$  inches, and it was proposed simply to close the supposed fistula. It was found, however, after etherization, possibly as a result of muscular relaxation, that the probe penetrated easily to a depth of 7 inches, and in cutting down upon the probe at a point  $1\frac{1}{2}$  inches from the meatus the canal was found to be lined with mucous membrane; hence the diagnosis of a malformation of the ureter. The latter was now dissected up from the incision to a point in the vesico-vaginal septum

corresponding to the normal situation of the vesical orifice of the left ureter; here also an opening was made into the bladder through which the ureter was turned in after its redundant portion had been excised, and its extremity was united by cotton sutures (the only ones at hand) to the edges of the vesical mucosa at the inner border of the perforation. The vaginal edges of the incision were then drawn together around the ureter by silver sutures. For eight days the bladder and vagina were washed out two or three times daily, and the urine was drawn every four to six hours. The sutures were then removed, the line of union found to be perfect, and the patient allowed to pass her urine naturally. The cotton sutures came away through the urethra. There was, of course, no further incontinence: the patient could retain her urine for four to five hours, and, with the exception of the subsequent formation of a vesical calculus, which was easily removed through a vesico-vaginal incision, the result of the operation was in every way perfect.

### III. AFFECTIONS OF THE FEMALE URETHRA.

#### § 1. ABNORMALITIES OF FORM AND POSITION.

##### 1. DILATATION.

The urethra may be enlarged throughout its whole extent or the dilatation may be limited to certain portions of its canal.

(a) *A uniform dilatation* of any such degree as to give rise to complaint or call attention to the condition is rarely met with. In women who have borne many children, and in the period immediately following childbirth, there is often a lax condition of the urethral walls as a part of the general lack of tonicity of the whole parturient canal; but most of the cases where a uniform dilatation of any considerable degree has been found have occurred in women with congenital atresia of the vagina; and in many of these cases coitus has been habitually effected by means of the urethra. The latter, when dilated, has in several instances been mistaken for the vagina, not only by the patient herself, but also by the attending physician: a case is reported by Daviat<sup>1</sup> in which a midwife at the onset of labor-pains manually dilated the urethra to a circumference of 12 cm. under the impression that it was a narrow vagina; in another case a dilated urethra was made by a physician the receptacle for a uterine pessary. Other causes of this form of dilatation are the insertion of wax candles or other foreign bodies into the urethra for purposes of masturbation; the passage of large calculi or portions of tumors by means of involuntary expulsive efforts of the bladder; eversion of a part or a whole of the mucous membrane of the bladder

<sup>1</sup> *Bull. de la Soc. de Chirurg.*, 1872, p. 560.

or urethra; and, possibly, now and then, artificial dilatation of the urethral canal.

The SYMPTOMS of uniform dilatation are usually insignificant when uncomplicated by other vesical or urethral lesions. Incontinence is the exception, not the rule, in cases resulting from congenital atresia of the vagina, and the patient is often able to perform her marital duties without inconvenience. In other cases the mucous membrane may be found excoriated and inflamed or more or less prolapsed—conditions to which it is certainly predisposed by the dilatation: the patient may then suffer from a certain amount of vesical irritation or there may be a painful tumor at the meatus—symptoms, however, which belong more properly to the complication than to the dilatation itself. In cases due to calculi, tumors, or vesical prolapse there is often incontinence of urine.

The recognition of this lesion will scarcely be attended with any difficulty when the dilatation is of sufficient extent to cause incontinence or prolapse. The prognosis must naturally be extremely guarded when there is established incontinence, while the other symptoms, such as prolapse or vesical irritation, can usually be completely relieved. When the condition has given rise to no symptoms whatever, it manifestly requires no treatment. When there is incontinence or prolapse, the attempt may first be made to bring about retraction of the relaxed urethral walls by the use of astringents. We may make occasional topical applications of strong tinct. iodini along the whole course of the urethra, and at the same time a gelatin bougie containing a few grains of alum or tannin may be daily inserted; or if these efforts do not succeed recourse may be had to a strong solution of lunar caustic (57 per cent.). If, however, these attempts are not followed by rapid improvement, it will be best to remove a portion of the redundant urethral tissue by means of Emmet's "buttonhole" operation, which is fully described in the section on Urethral Prolapse.

(b) *Urethrocele*, partial or saccular dilatation of the urethra, is an uncommon affection, and yet highly important because capable of producing very serious results. The dilatation may be at either orifice or in the middle portion of the urethra; and it is with the latter variety that we are now chiefly concerned, since the two former are almost invariably secondary to calculi or tumors. Dilatation of the middle portion presents two distinct forms, according as the tumor which protrudes from the urethro-vaginal septum represents simply a bagging of the inferior urethral wall or a diverticulum which communicates with the urethra by a more or less contracted orifice. In either case the upper wall of the urethra may deviate but slightly, if at all, from its normal course, or it may in the former more diffuse variety of dilatation prolapse somewhat into the cavity of the sac, and the whole urethral canal may be somewhat lengthened and tortuous. The interior of the

sac is lined with a greatly thickened and inflamed mucous membrane, which may also be the seat of numerous erosions and ulcerations. A urethrocele may be as large as a good-sized hen's egg.

The ETIOLOGY of urethrocele is by no means perfectly clear. With regard to the diverticular form, the most probable supposition is that a cyst of the urethral wall, very likely congenital, has subsequently opened into the urethral canal: Englisch<sup>1</sup> has given a careful description of these cysts, and established their comparative frequency in the newly born. The formation of a simple urethral dilatation is undoubtedly favored by any nutritive disturbance of the urethral wall or the urethrovaginal septum. Trauma during childbirth, violent coitus or masturbation, the parturient state, and the flabby condition produced by repeated labors, are all predisposing causes; the same may possibly be said of a subacute urethritis. If under such conditions a slight periurethral thickening at the meatus be acquired as a result of prolonged inflammation, or if great vesical tenesmus be kept up for a long time by fissures, cystitis, or other source of vesical irritation, it is not difficult to understand how an urethrocele might be produced. If there be any organic stricture of the urethra or any mechanical impediment to the free passage of urine, dilatation of that portion of the urethra above the stricture is of yet plainer origin. Still, in most of the cases reported no marked stricture seems to have existed, nor is dilatation often mentioned as a result of stricture when the latter has been found. Urethrocele is most often encountered in women who have borne children.

SYMPTOMATOLOGY.—A simple widening of the urethral meatus causes no inconvenience, although it favors the occurrence of prolapse. Dilatation at the vesical orifice often results in incontinence of urine, which is, however, likely to disappear when the cause of dilatation is removed. When there is a sacular dilatation of the middle portion of the urethra, the collection and retention of urine in the sac soon give rise to troublesome symptoms. The urine becomes ammoniacal, and the irritation of the urethral wall soon develops a urethritis. With the impaired nutrition of the walls and the constantly increasing violence of the efforts at micturition caused by reflex irritability of the bladder the urethra becomes more and more dilated; this is also favored by the mechanical impediment to the escape of urine which results from counter-currents in the distended sac. With every micturition the stretching of the sac gives rise to cutting, tearing pains which continue long after the act itself is finished, and the sac receives a fresh supply of urine to dribble constantly from the meatus during the intervals, or to be suddenly expelled, to the unspeakable annoyance of the patient, whenever a cough or sneeze or other like effort causes sudden pressure upon the tumor. Soon the inflammation creeps up into the bladder; its contents

<sup>1</sup> *Med. Jahrbüch. d. K. K. Gesell. d. Aertze in Wien*, 1873, Heft ii.



become alkaline, and all the symptoms of cystitis are added to the already deplorable condition. There may be actual incontinence of the vesical sphincter.

If, however, the urethrocele has only a narrow communication with the urethral canal, the symptoms are somewhat modified. There will still be more or less dribbling of urine, and the walls of the sac will become inflamed; but the urethra itself remains for a long time comparatively healthy, cystitis may not supervene, and the dysuria may be of a more paroxysmal nature: this latter seems to be due to a varying condition of the opening, which at one time permits the free entrance of urine—again remains closed, sometimes for several days.

Examination of a woman with urethrocele will disclose a tumor of the urethro-vaginal septum protruding more or less from the introitus vaginæ, and liable at first sight to be mistaken for a cystocele. Its size may equal that of a hen's egg. It is covered with comparatively healthy vaginal membrane, is soft and compressible, and on firm pressure a thick, cloudy, or purulent urine is made to escape from the meatus. A sound may be passed downward into the sac, so that its beak can be felt at the lowest part of the tumor, or it may be carried straight backward along the superior urethral wall into the bladder. The endoscope may show the walls of the sac to be thickened, congested, and covered with erosions and granulations.

The DIAGNOSIS is not attended with difficulty. We can easily distinguish between the two forms described as dilatation proper and an urethral pocket or diverticulum. In the latter the sound will engage with more or less difficulty—perhaps in the constricted opening of the sac, and once within the latter its antero-posterior motion will be limited. If the dilated urethra is at the same time dislocated downward, the sound can no longer be passed straight backward from the meatus to the bladder, as in simple urethrocele. To distinguish from cystocele complicated with urethral dislocation we have only to remember that reduction of cystocele by pressure will never cause the escape of urine at the meatus, and that with cystocele the catheter must be passed at least an inch before urine will flow. A perinurethral abscess which has opened into the urethra can be recognized by its acute origin and its more indurated walls.

The PROGNOSIS will depend upon the complications. If there is a simple urethral diverticulum, with no bladder complications, or a sacular dilatation of which the cause is evidently organic stricture or a tumor, and no cystitis of very long standing is present, we may feel quite sure that treatment will prove successful. When there is no removable cause, and a chronic cystitis has developed which may already have led to serious organic changes in the vesical walls, or possibly in the kidneys themselves, the prognosis must necessarily be guarded.

**TREATMENT.**—In both forms of urethrocele, whether saccular or diffuse, the first step in the treatment should be to lay open the sac at its most dependent portion by a longitudinal incision through the urethro-vaginal septum. In case of a narrow-mouthed diverticulum, where the urethral walls beyond the limits of the sac are not much inflamed, the redundant tissues—or, in other words, nearly the whole sac—may be excised and the wound closed at once with silver sutures. When, however, the dilatation is more diffuse and complicated by a higher grade of urethritis, the incision should be left open both for the purpose of draining the cavity of the urethra and for convenience in the application of remedies to the diseased surface. These will consist of the various astringents and caustics mentioned under the Treatment of Urethritis, and, above all, in frequent and thorough douching of the urethra with hot water. Under the influence of the latter and free drainage of the sac the tissues rapidly acquire a more healthy appearance and the dimensions of the tumor become greatly diminished, so that eventually the fistula may be safely closed in the usual manner, any remaining excess of tissue being at the same time excised. Any cause of vesical irritation outside the bladder, or any mechanical obstruction at the meatus, must of course be recognized and removed. When the urethrocele is complicated by a chronic cystitis, it will usually be advisable to relieve the latter at once by a vesico-vaginal incision in addition to that of the urethra.

## 2. URETHRAL STRICTURE.

Organic stricture of the female urethra of sufficient degree to give rise to urinary symptoms is rarely met with. Ricord is of the opinion that more or less contraction is a frequent result of blennorrhœa, but that no stenosis is usually produced, owing to the great dilatability of the canal. An organic stricture may result from any traumatic, inflammatory, or ulcerative lesion of the urethral wall of sufficient extent to produce cicatricial tissue. Such are traumatic injuries from childbirth or operative procedures in the vagina; urethritis, especially the specific form; syphilitic ulcerations, primary or tertiary, and *ulcus molle*; possibly also *lupus*. The application of caustics is a very frequent cause, although Ricord regards the great majority of cases as of gonorrhœal origin.<sup>1</sup> The stenosis is most frequent at or near the meatus, although it may occur at the vesical orifice or at any intervening point. A general narrowing of the whole canal sometimes results from its disuse in old cases of vesico-vaginal fistula.

The SYMPTOMATOLOGY may be readily inferred from the nature of the lesion. There will be gradually increasing difficulty of micturition,

<sup>1</sup> Fisseaux: *Ann. d. Gynéc.*, 1879, xi.

the stream will diminish in force and size, and the eventual result may be retention of urine. In other cases micturition may be frequent from reflex irritation of the vesical detrusor; and sometimes there is actual incontinence, which, according to Fisseaux and Blum, may continue even after the stricture is cured. When the stricture is at the upper portion of the urethra near the vesical neck, Skene has observed a difficulty of micturition out of all proportion to the degree of stenosis—a consequence, probably, of greater reflex irritation of the sphincter. As in the male, the eventual result of stricture, when left to itself, is vesical hypertrophy, and later paralysis, with cystitis and hydronephrosis.

The **DIAGNOSIS** cannot be made from the symptoms alone. The blocking of the urethra by a calculus, a foreign body introduced from without, a new growth or inflammatory œdema; pressure upon the urethra by a prolapsed uterus or other vaginal tumor; dislocation of the urethra so as to form a sharp angle in its course; cicatricial bands in the vagina which cause compression,—these are some of the conditions which give rise to similar disturbances of micturition. In cases also of cystitis and of fissure or congestion of the vesical neck the urine is often passed with great straining and difficulty, owing to spasmodic contraction of the vesical and urethral sphincters, which hinders too the free passage of a sound. If, however, the urine is examined, if the finger is passed along the urethro-vaginal septum in search of a point of thickening, if sounds of different sizes are introduced into the urethra, and any obstruction, its relation to the point of thickening, and the force necessary to overcome it, are carefully noted,—the diagnosis will scarcely be difficult. Fournier has observed that the stricture which results from a tertiary lesion is surrounded by peculiarly dense, almost cartilaginous, tissue.

In stating the **PROGNOSIS** it must be remembered that incontinence, if present, may persist after dilatation of the stricture, and that a secondary cystitis may have already led to serious renal disease. In uncomplicated cases the prognosis is good, except that in stenosis at the vesical orifice tenesmus is apt to continue even after the normal calibre has been restored.

The appropriate **TREATMENT** is gradual dilatation with bougies, which need not in most cases be carried beyond No. 15 F. If there be a very dense cicatrix, it may be divided by means of Otis' urethrotome, and the incision kept from closing by the daily passage of a sound. In still other cases where contraction is extreme we may use electrolysis. The negative pole of a galvanic battery is attached to an olive bougie of the requisite size, while the positive pole is put on the patient's abdomen or thigh; the olive is pressed gently against the point of stenosis and the number of cells gradually increased from one up to

the number required to produce an intensity of current equal to fifteen milliampères as indicated by the galvanometer; this application should be made for four or five minutes at each sitting: of the latter, four or five are usually necessary to complete the dilatation, which should be permanent.

### 3. DISLOCATION OF THE URETHRA.

The urethra is said to be dislocated when it no longer retains its normal course and position: its calibre is not thereby necessarily altered. The dislocation may be in almost any direction except forward. Most frequently the internal orifice is drawn farther up behind the pubes by the gravid uterus or a pelvic tumor, of which the only result is a somewhat greater difficulty in catheterization. Downward dislocation is the only one which may be followed by serious consequences and which calls for especial description. This form may involve the whole or only the posterior half of the urethra: if partial, a sound will pass for a certain distance in the normal direction, and then be deflected downward toward the vagina; if complete, the course of the whole canal will be directly downward toward the perineum, where the vesical orifice will be situated. The cause of this misplacement is usually a prolapse of the anterior vaginal wall in connection with cystocele or procidentia; it may, however, exist as an independent condition: in either case a ruptured perineum is the usual exciting cause. The anterior vaginal wall, with the urethra, may also be pushed down at labor before the advancing head—a condition which usually remedies itself, but may persist if the perineal support is lost or the patient goes about before involution is fairly advanced. Settling of the uterus after delivery or of an ovarian cyst after puncture may cause the lengthened urethra to double upon itself, so that a sharp angle is formed in its course; such a condition often causes retention, but a catheter may be easily passed if the prolapsed portion be first pushed back by the finger; rest in bed soon enables the parts to regain their tonicity, and recurrence of the dislocation is thus avoided.

The SYMPTOMS of downward dislocation are frequent and difficult micturition. After each act a certain amount of urine is retained in the urethra, which may eventually result in urethritis and cystitis. Incontinence is also of common occurrence.

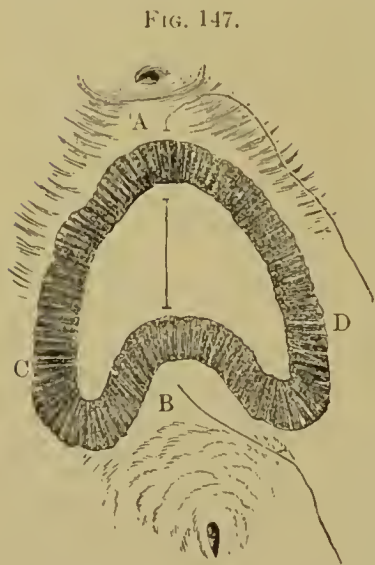
The DIAGNOSIS will lie between urethrocele, dislocation, and cystocele. If the latter alone is present, the sound must pass backward through the normal urethra before entering the bladder; and this is also possible in case of urethrocele, while in dislocation the sound is necessarily deviated.

The TREATMENT recommended by Skene,<sup>1</sup> to whose description of

<sup>1</sup> *Diseases of the Bladder and Urethra in Women*, 1878.



this condition we are chiefly indebted, is the application of a pessary which he has devised especially for prolapse of the anterior vaginal wall; this will answer for most cases where there is dislocation of only the posterior portion of the urethra. If the whole urethra is prolapsed, it may be necessary to keep it in position for some days by a vaginal tampon until the tonicities of the parts is improved and a pessary alone is sufficient. If these attempts fail, we may resort to an operation employed by Emmet, by means of which the vesical orifice of the urethra is drawn up toward the cervix uteri.<sup>1</sup> With the patient in Sims' position that part of the anterior vaginal wall indicated by the darkened portion of the figure is dissected off, and the opposite edges of the denuded surface united with



deep silver sutures: the first suture connects A and B, while the others radiate somewhat from the lower to the upper edge.

#### 4. PROLAPSE OF THE URETHRAL MUCOUS MEMBRANE.

While a slight protrusion of the membrane at the lower margin of the meatus is of common occurrence, a sufficient prolapse to produce a marked tumor is rarely met with. A flabby condition of the tissues of local or general origin or a dilatation of the urethral canal undoubtedly favors its development; but an exciting cause must usually be sought in some source of vesical or rectal irritation, and consequent straining at micturition or at stool. Vesical calculus and cystitis, vesical and anal fissure, hemorrhoids, uterine displacements, and in children rectal parasites and prolonged spells of coughing, will therefore enter oftenest into the etiology. Prolapse is usually of gradual development, but may be extremely acute; in one case a tumor of considerable size, and representing simply a urethral prolapse, appeared for the first time after a long walk in a woman who had always been free from any such trouble. The great majority of cases have occurred either in young girls from three to fifteen years of age of hysterical or chlorotic type, or in the old and debilitated.

The prolapse may involve the whole meatus or only a limited, usually the lower, portion of its circumference. In the former case the urethral orifice will be in the centre of the tumor, in the latter at its

<sup>1</sup> *Op. cit.*, p. 383.

periphery. The prolapsed portion may be swollen and œdematous, and its surface fissured and bleeding so as to have every appearance of a new growth. In some cases the prolapse represents simply a redundancy of mucous membrane about the meatus, while in others of more recent origin there is an actual displacement of the whole canal, the parts about the vesical orifice also changing their position.

This condition of prolapse tends to increase any vesical tenesmus or dysuria which may have already existed. The efforts at micturition become more frequent and painful as the obstruction at the meatus increases and the urethra becomes inflamed. Cystitis may eventually result, and thus the case acquire a decidedly serious character. The condition is analogous to rectal prolapse, inasmuch as there is in both a typical *circulus vitiosus*, the prolapse increasing with the tenesmus, and the latter becoming more and more severe in proportion to the extent of prolapse.

The character of the tumor varies with the length of time that it has been down. If recent, it may still have the pink color and moist appearance of healthy mucous membrane. After a certain time has elapsed it will be dark red or blue, and denser to the feel; its surface becomes dry and glistening, or perhaps excoriated by constant friction, and hence extremely sensitive.

The DIAGNOSIS between this condition and the various new growths which may appear at the meatus is not usually difficult. A circular prolapse is sufficiently characterized by the presence of a central opening. With the other forms the possibility of reduction, the only moderate sensitiveness of the tumor, its compressibility, the folds and perhaps glands which reveal the character of the surface, should be especially noted; moreover, in cases where reduction is impossible the treatment does not differ from that which should be pursued in case of tumor.

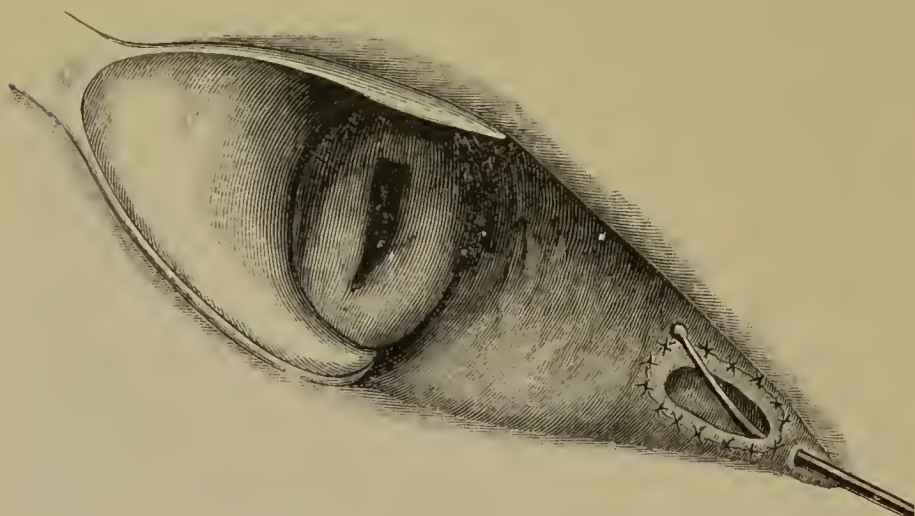
TREATMENT.—When the prolapse is recent, we should first attempt to effect reposition by means of gentle pressure with the fingers, aided, if necessary, by a large sound, which may be carried carefully backward into the bladder, and in case of success cautiously withdrawn. Reposition may also be possible in some cases of long standing, especially if the prolapsed portion be first reduced in size by the application of astringents and hot douches. If reduction is effected, rest in bed must be enjoined until the urethral canal has been made to retract by the topical use of tannin bougies, strong tincture of iodine, lapis mitigatus, or impure carbolic acid, according to the condition of the mucosa. Meanwhile, any cause of vesical tenesmus or other straining effort must receive appropriate treatment: we must not neglect to pass a sound into the bladder, since a vesical calculus may be the origin of the whole trouble. If the prolapse recurs at any subsequent mictu-

rition, it must be at once replaced—possibly a Goodman catheter left for a time in the bladder.

If these attempts fail to cure, the prolapsed portion should be excised or Emmet's buttonhole operation should be performed. For the former, which is best confined to irreducible cases, Winckel prefers the knife and operates as follows:<sup>1</sup> A sound is passed into the bladder, and the tumor is fastened on each side close to the sound with tenacula to prevent subsequent retraction of the membrane into the urethra; the tumor is then excised external to the tenacula, and the two edges of mucous membrane are stitched together with silver wire. Emmet passes a double thread through the base of the tumor, ties each half, and excises close to the ligature. Another good method is with the galvano-cautery loop.

Excision is most suitable where there is simple redundancy of the tissues about the meatus. If, however, the whole urethra is dilated and its whole membrane stretched and voluminous, the superfluous portion may be removed by what is known as "Emmet's buttonhole operation:"<sup>2</sup> a slit is made in the middle of the urethro-vaginal septum down to the urethral mucosa, not through it; a fold of the latter, representing the excess of tissue, is then drawn through the slit by means of tenacula and fastened by a suture at each angle. This fold is then

FIG. 148.



Emmet's Buttonhole Operation in the Urethra.

excised close to the septum, and the opening closed by still other sutures which include both vaginal and urethral membranes; or it may, in case of urethritis, be left open for purposes of drainage and topical applications, and closed at a future operation.

<sup>1</sup> *Op. cit.*, p. 43.

<sup>2</sup> *Op. cit.*, p. 729.

## §2. DISEASES OF NUTRITION.

## 1. URETHRITIS.

Probably the great majority of cases of urethritis are of specific origin and secondary to gonorrhœal infection of the vagina. Sigmund found in 763 cases of gonorrhœa in the female 476 of vaginitis and urethritis together, 282 of vaginitis alone, and only 5 of uncomplicated urethritis. Still, congestive and inflammatory conditions of the urethra of non-specific origin are by no means uncommon, and may result from a great variety of causes. Many cases seem to be due to exposure to cold; others result from the irritation of certain urinary constituents, such as uric acid in gout or pus in cases of pyelitis; still others result from actual trauma, such as occurs with the passage of calculi, with the introduction of foreign bodies from without, with violent coitus, or a severe labor. Another important factor in the etiology is the intimate relation between the periurethral plexus and the blood-supply of the other pelvic organs; thus we often find a mild form of urethral catarrh accompanying malpositions or fibroids of the uterus, while during the period immediately preceding menstruation there is often an exacerbation of any existing urethral inflammation, which is in turn relieved by the establishment of the flow. Again, the urethra is apt to participate in the various catarrhal affections of the vulva and vagina, especially the vulvitis of scrofulous children. Finally, a urethritis may sometimes appear in the course of the exanthemata, the specific lesions of measles, scarlet fever, and smallpox having all been found upon the urethral mucous membrane.

The SYMPTOMS in recent cases are chiefly burning pain and smarting at micturition. This may lead to voluntary retention, but more frequently irritation of the vesical neck causes the urine to be voided somewhat oftener than usual, or there may, especially with the gonorrhœal variety, be veritable tenesmus. Local examination discloses a red pouting meatus; the whole urethral canal is swollen and sensitive, causing partial obliteration of the canal and rendering catheterization painful or even impossible. Vaginal pressure along the urethra may cause a purulent fluid to escape at the meatus, and micturition is often followed by the appearance of a few drops of blood. In ten to twelve days the pain subsides, the purulent discharge becomes less copious, and the disease, even if let alone, shows a natural tendency to disappear in the course of four or six weeks from the date of its first appearance. Such is the ordinary course of specific urethritis, which is, however, usually more or less masked by the accompanying vaginitis, and becomes more prominent as the vaginitis disappears. Owing to the shortness of the urethra and the ready escape of inflammatory secretion there is much



less tendency to cystitis than in the male, and the whole course of the disease is much less virulent. In the simple or non-specific form the symptoms are still milder: there may be scarcely any purulent discharge, and the affection may disappear entirely under treatment in the course of a very few days.

Now and then acute urethritis gradually assumes a chronic character, or the disease may take a subacute form from the outset. Pain at micturition is then much less or entirely absent, and a drop or two of thin muco-purulent discharge can be pressed from the meatus only when an hour or more has elapsed since the last passage of urine. The urethral walls become greatly thickened, and may be felt on vaginal examination as a hard cord of induration, sometimes as large as the finger. The mucous membrane is also covered in some cases with granular erosions or even ulcerations. There may be also a varicose condition of the veins at the meatus, and the mucous membrane may be more or less prolapsed, or, if the case is of specific origin, the urethral orifice may be the seat of several condylomata. Now and then urethritis is complicated by the formation of a periurethral abscess.

DIAGNOSIS.—It is thus seen that urethritis may exist in very varying degrees, and that the diagnosis will not always be easy. The acute specific form will present the least difficulty: it is generally accompanied by an intense purulent inflammation of vulva and vagina; the smarting and tenesmus are often excessive, and after the third or fourth day there is a thick, purulent discharge from the meatus. Non-specific urethritis, such as results from trauma or exposure to cold, may likewise be of sudden onset, but the discharge never consists of pure pus, and is usually scanty or entirely wanting. In the chronic and subacute forms the diagnosis must be made by means of the endoscope and other methods of physical examination. The only disease with which acute urethritis is likely to be confounded is cystitis: in the latter there is greater vesical tenesmus, the constitutional effects are more marked, and pus escapes from the urethra only at micturition instead of in the intervals.

The TREATMENT of a fulminant urethritis, such as accompanies a vaginal gonorrhoea or follows exposure to cold, should be at first chiefly palliative, and consist of mucilaginous drinks, warm sitz-baths, hot vulvar and vaginal douches, and opiates if necessary; when cold is the cause, hot mustard foot-baths, mild catharsis, and diaphoretics will be beneficial. After eight or ten days, when the pain and smarting have grown considerably less, we may begin the use of astringents. We may employ gelatin suppositories, each containing gm. .20 of alum, or gm. .06–.10 of tannin, or gm. .03–.06 of sulphate of zinc; and of these, one should be inserted daily. Or the urethra may be douched by means of Skene's reflex catheter; and of the various astringents which may be

used the following combination of Ultzman is one of the most valuable we possess :

R<sub>y</sub>. Aluminis,  
Zinci sulphatis,  
Acid. carbolicæ, āā. .50-1.00;  
Aq. dest. 400.

Of this solution gm. .50-1.00 should be injected once or twice daily ; like all other topical treatment of the female urethra, this must be applied by the physician himself. Instead of a reflex catheter, which must be inserted as far as the vesical orifice, a syringe may be used with a mouth wide enough to cover the meatus, and not requiring insertion : the finger may be pressed against the vesical neck while the injection is being made, to prevent the entrance of fluid into the bladder. Small injections may also be made with the ordinary " P " syringe.

Subacute catarrh often disappears of itself as soon as the irritation or impeded circulation which causes it has been corrected. If not, the various astringents may be used as above recommended. If the urethritis is chronic and mild means have proved unavailing, the urethral mucosa should be thoroughly brushed with a 3 to 6 per cent. solution of nitrate of silver. Winckel recommends the lapis mitigatus, and even the solid stick has been used by some with good effect. In cases of granular erosion impure carbolic acid is a less painful application than the solid stick or strong solutions of silver, and its use has proved very effectual.

## 2. URETHRAL ULCERATIONS.

Typical ulcerations are not at all uncommon in the female urethra, most often as a result of urethritis, when they are usually accompanied by other spots of granular erosion : the latter is a term applied to more or less circumscribed patches of mucous membrane which are of a brighter red and more granular appearance than the other parts, and represent losses of the upper epithelial layers with hypertrophy of the underlying papillæ. Less frequent are primary and secondary syphilitic ulcerations and ulcus molle. Among 244 cases of soft chancre in women Lewin found 6 of urethral ulceration alone, and 5 others of the latter combined with ulceration of the genitals. Urethral ulcerations may also be of lupoid, tuberculous, or cancerous origin : the former is always an extension simply from lupus of the external genitals. There is still another form of urethral ulceration, described first by West and later by Duncan, Schmarbeck, Schroeder, and others,<sup>1</sup> which is met

<sup>1</sup> Vide Ehrhardt: *Ueber ch. ulcerat. d. weib. Harnröhre*, Berlin, 1884.

with chiefly in prostitutes, and results from frequent attempts at coitus where the vagina is so small and contracted that the penis cannot effect an entrance. The ulceration is thought by some to be of specific origin, but usually no other signs of syphilis are to be found. The region of the meatus and the fossa navicularis become at first excoriated, then ulcerated, and the destruction of the urethra may be so extensive in severe cases that there remains only a cone-shaped excavation, with its apex at the vesical orifice and its base representing the greatly enlarged and gaping meatus.

**SYMPTOMS.**—These ulcerations and erosions may cause great vesical irritability and tenesmus, with burning pain at micturition. These symptoms are often out of all proportion to the small erosion which may constitute the only lesion, and are largely of reflex nature. In the cases of extensive ulceration associated with narrow introitus vaginae, micturition is painful and very frequent, or there may be actual incontinence; the surface of the ulcer is also extremely sensitive. Most of these ulcerations can only be detected by the use of the speculum or endoscope. A soft chancre may perhaps be recognized as such by the presence of similar lesions upon the genitals or by inflamed inguinal glands.

The **DIAGNOSIS** of a syphilitic lesion will depend upon the induration of the underlying tissues and the constitutional symptoms. Lupoid and malignant ulcerations are very rare, and almost invariably secondary to like disease of the vulva.

**TREATMENT.**—A syphilitic ulcer demands the same local and constitutional treatment as when found in other situations. A granular erosion or catarrhal ulceration should first be treated by the daily insertion of a urethral suppository containing gm. .20–.30 of iodoform. If improvement does not follow this treatment, the ulceration should be touched occasionally with a 5 per cent. solution of silver or with impure carbolic acid: for this purpose we may use Skene's speculum or one of the various ear and nasal specula; possibly separation of the urethral walls by means of our ordinary dressing-forceps may suffice. To render the application less painful it may be preceded by the insertion of a urethral suppository containing gm. .03–.06 of cocaine. The same treatment may be pursued in cases of urethral chaneroid. The form of ulceration found in prostitutes is best treated by douches and astringent washes or powders, or in severe cases by the Paquelin cautery.

### 3. CATARRH OF SKENE'S GLANDS.<sup>1</sup>

These glands may participate in either simple or gonorrhœal catarrh of the vulva or urethra. While the non-specific form does not tend to

<sup>1</sup> *Vide Proc. Med. Soc. King's Co., 1880, v. p. 333.*

persist, and usually requires no special treatment, the gonorrhœal affection first becomes noticeable after the inflammation of the neighboring parts has subsided. The mouths of the glands then appear as small yellow points surrounded by hypertrophied and usually slightly prolapsed tissue, so as to present at the meatus every appearance of a urethral caruncle. These tissues are also very sensitive, and give rise to great pain on walking or even sitting. Occasionally there is irritable bladder, although this symptom is by no means as frequent as urethral caruncle. There is usually some smarting at micturition. As long as these glands continue to be the seat of a gonorrhœal inflammation the patient is subject to constantly-recurring exacerbations of general urethritis.

The great tenderness at the urethral orifice, which is the most prominent symptom, together with the discovery of a small tumor at the meatus, makes the condition quite likely to be mistaken for caruncle. The mouths of the glands should always be carefully searched for, and when found they should be watched while pressure is made against the anterior vaginal wall just behind the meatus: this will cause the escape of a drop of pus in case of catarrh, and thus establish the diagnosis.

Besides these secondary affections, Skene believes these glands to be sometimes the seat of primary tuberculosis. The symptoms and appearances presented do not differ at the outset from those of the gonorrhœal variety just described. There is, however, no history of gonorrhœa to be obtained, while a secondary urethritis soon makes its appearance, and the glands may ulcerate or become caseous—conditions which never follow the gonorrhœal form. Terillon<sup>1</sup> also has recently observed that certain cases of urethral caruncle are very prone to recur after extirpation, and that just these cases are frequently followed by a general tuberculosis of the urinary organs. Whether these recurrent “fungoids” of Terillon are really the tuberculous and inflamed glands of Skene remains to be confirmed by other observers. In case ulceration, resistance to treatment, and absence of gonorrhœal history should arouse suspicion of tuberculosis, the pus secreted by the glands should be examined for the tubercle bacillus and the prognosis be somewhat guarded.

The TREATMENT of inflammation of these glands which has thus far proved universally successful<sup>2</sup> is to slit up the glands along their urethral aspect by means of a pair of fine-pointed scissors, followed by topical applications of Churchill's tincture of iodine, or by packing the cavity of the gland with cotton saturated with perchloride of iron. This will effect a rapid and permanent cure, except in the very rare cases of tuberculosis.

<sup>1</sup> *Progrès méd.*, Paris, 1880, viii. p. 101.

<sup>2</sup> Skene: *op. cit.*; also Reed: *Clinn. Lancet*, 1875, xiv. p. 76.



## § 3. NEW GROWTHS.

Urethral tumors are known under the various names of vascular tumors, fungoid excreescences, urethral polypi, and caruncles. These different names represent in part material differences in structure which may be best understood by adopting, with Winckel, an anatomical classification according to the particular tissue from which these tumors develop. The following forms may be met with:

- Condyloma;
- Papillary angioma and varix;
- Cysts and myxadenoma;
- Fibroma;
- Sarcoma;
- Epithelioma.

(a) Of these, the malignant forms, sarcoma and epithelioma, are of the least importance, because of their extreme rarity. Sarcoma has been only once observed, in the form of a walnut-sized tumor at the meatus.<sup>1</sup> Epithelioma is probably never primary in the urethra, and very rarely secondary to cancer of the vulva or internal genitals: a form of periurethral cancer has, however, been described by Melchiori,<sup>2</sup> which begins as a small painless tumor of the vulva, and extends along the periurethral cellular tissue without involving the urethral mucosa; later, ulceration of the meatus may supervene.

(b) Myxadenoma, commonly called mucous polyp, is also seldom encountered in the urethra. These tumors are quite similar in structure and appearance to the well-known mucous polypi of the rectum and uterus; they are not especially painful, are of bright-red color, and have a smooth surface; they may grow from the meatus or from the deeper portions of the urethra.

Urethral cysts have been described by Englisch<sup>3</sup> as of not infrequent occurrence at birth, when they may project into the urethral canal so as to partially occlude its lumen, or lie entirely concealed in the urethro-vaginal septum. Their situation is usually on the urethral floor near the meatus; their inner wall is covered with hypertrophied papillæ, which makes it probable that they are simple retention-cysts either of the follicles of Morgagni, or more often, perhaps, of Skene's glands. These cysts persist now and then into adult life, and may reach a very large size, so as to form extensive vulvo-vaginal tumors, which are found to be separated by only a very thin wall from the urethral canal, and form occasionally a mechanical impediment to the passage of urine: their possible connection with certain forms of urethrocele has already

<sup>1</sup> Winckel: *op. cit.*, p. 53.

<sup>2</sup> Vide Blum: *Arch. gén. de méd.*, 1877, p. 129.

<sup>3</sup> *Wiener med. Presse*, 1881, p. 599.

been alluded to. Simple retention-cysts are also found occasionally in adults near the vesical orifice.

(c) Fibroid tumors are scarcely more frequent than the forms hitherto described. They are solid connective-tissue tumors, either sessile or pedunculated, of smooth or lobulated exterior, and sometimes as large as a hen's egg: they may grow from any portion of the urethral canal, and their importance is, as a rule, in direct proportion to their obstructive character.

(d) Varices, or urethral hemorrhoids, may be found only at the under border of the meatus, or, more rarely, along the whole urethral floor. The dilated veins may cause the mucosa to protrude in the form of bluish-red tumors analogous to those of the anus. These tumors are smooth, slightly sensitive to the touch, and have a tendency to bleed very readily; the passage of a sound will sometimes give rise to excessive hemorrhage.

(e) All these tumors are similar in structure to analogous tumors of other organs, and are none of them especially painful; they are therefore of more or less insignificance, both clinically and anatomically, as compared with the much more frequent and painful tumors to which Winckel has given the appropriate name of "papillary angiomata." These growths are peculiar to the female urethra, and are commonly known as irritable urethral caruncle. Verneuil was the first to describe their histological structure, and Virchow, Wedl, and Reid have also made them the object of considerable study.<sup>1</sup> They grow usually from the inferior border of the meatus, but may, however, occupy any portion of its circumference or be situated higher up in the canal. They may be sessile or stalked, are usually single, sometimes multiple, and of bright-red or bluish color; they are rarely larger than a pea, have a granular surface, bleed readily on touch, and are extremely sensitive. Anatomically, these growths represent hypertrophied papillæ and contain an enormous number of vascular loops.<sup>2</sup> The walls of the latter are not thickened, nor are they ectatic, thus differing from those of an ordinary telangiectasis; still, the tumors are undoubtedly to be reckoned among the angiomata, since a rich development of blood-vessels is their most striking feature. The papillæ are covered sometimes with cylindrical, usually with pavement, epithelium, and contain, according to Reid, a rich supply of nerve-filaments.

ETIOLOGY.—Not much is known as to the etiology of urethral tumors. Papillomata are rarely found before puberty; hence the circulatory disturbances attending menstruation and childbirth may be held in some way responsible. Englisch thinks he has found a predisposing element in the hypertrophied papillæ of the cysts already described; he believes that the cysts rupture soon after birth, but that

<sup>1</sup> *Op. cit.*, p. 55.

<sup>2</sup> Virchow: *Geschwülste*, iii. p. 463.

with the beginning of menstruation these hypertrophied papillæ receive a fresh impetus to further development. Possibly inflammation of Skene's glands may have the same predisposing influence: the neighborhood of their mouths is certainly the most common seat of caruncle. Scanzoni and others regard all cases as of gonorrhœal origin. With reference to the other urethral tumors, it need only be mentioned that urethral hemorrhoids often originate in uterine dislocations and other like causes of venous stasis.

**SYMPTOMS.**—With the exception of the papillary angiomata and the rare cases of malignant disease, urethral tumors are important only in so far as they form an obstruction at micturition, or if the tumor prolapse from the meatus it may become fissured and excoriated, and thus give rise to scalding and itching at the vulva, or possibly to masturbation. The results of obstruction will be the same as those described under Stricture, and need not again be detailed.

With papillary angioma a train of symptoms and consequences results, which bears no relation to the apparent insignificance of the tumor, and which may have a serious effect upon the constitution of the patient. These growths are characterized by their exquisite sensitiveness to touch and to the contact of urine. A caruncle no larger than the head of a pin may cause the most intolerable agony with each act of micturition. This pain may be simply the result of friction of the stream against the tumor; but more often the distress is greatly augmented by a reflex vesical spasm, which renders micturition extremely difficult and painful, at the same time that its frequency is increased. The vaginal sphincter also participates in this reflex irritability, and a permanent vaginismus often renders coitus absolutely impossible; the same is true of digital examination or any attempt to introduce an instrument into the urethra or vagina. Walking, or even sitting, is painful to these patients, especially when the tumor protrudes more or less from the meatus. Hemorrhage from the growth is a prominent symptom in many cases, and a high grade of anemia is often produced. Eventually, the appetite begins to fail, the sleep is broken, and this, together with the constant worry and distress and the not infrequent hemorrhage, may reduce the patient to a condition of physical and nervous exhaustion and debility such as is usually found only with serious constitutional disease. According to the writer's experience, there is no affection of the genito-urinary system capable of producing such a total wreck of the nervous system, such a condition of utter misery, as urethral caruncle. In rare cases the long-continued vesical irritation terminates in cystitis.

**DIAGNOSIS.**—Any growth at or near the meatus is not likely to be overlooked if a vesical examination is made while the lips of the meatus are held apart with a pair of dressing-forceps or a Jarvis speculum.

The distinguishing features of the various urethral neoplasms have already been sufficiently described. Other lesions with which such a tumor at the meatus might be confounded are vesical polyp, prolapse of the urethral or vesical mucosa, and hypertrophy resulting from catarrh of Skene's glands. The latter may be recognized by the swollen hyperæmic condition of the mouths of the glands, and the escape from them of purulent secretion under pressure of the finger against the septum. Urethral prolapse can usually be reduced, is seldom very sensitive, and often forms a complete ring with a central opening. A pedunculated tumor which appears at the meatus may be taken for a prolapsed vesical polyp or vesical inversion, although the mistake has usually been reverse: whenever a tumor is found protruding at the meatus which has no evident attachment to the urethral wall, attempt should be made at reduction, and in case of vesical inversion or prolapsed polyp this will almost invariably succeed.

Tumors of the deeper portions of the urethra are not always so easily discoverable. A papillary angioma in this unusual situation would hardly fail to cause severe pain when pressure is made along the urethro-vaginal septum. Fibromata may be easily felt from the vagina. A soft mucous polyp is most apt to escape detection, and if endoscope and speculum fail to discover any lesion in spite of decided symptoms of urethral irritation, Emmet's method of examination may be employed, as described in Part I.

PROGNOSIS.—Fibrous and mucous polypi show no tendency to recur after excision. Condylomata do have this tendency to a slight degree; they have, however, but little clinical significance. Cysts are always susceptible of radical cure, while sarcoma and epithelioma are subject to the same laws here as elsewhere. Varices can usually be treated with at least partial relief, and in some cases this will be complete. Papillary angioma often recurs, but in the great majority of cases this may be prevented by proper treatment, and the prognosis is therefore good in the absence of serious complications, such as cystitis, except that in cases of frequent recurrence after thorough extirpation, especially if a purulent urethritis has developed, suspicion of possible tuberculosis should be aroused.

TREATMENT.—This consists in removal of the growth and thorough cauterization of its base in all forms likely to recur. These ends may be achieved by several different means, from which a judicious selection must be made in each individual case according to the character of the growth. For all tumors which are easily accessible the method preferred by the author is to seize the growth at its base by means of pressure-foreeps, and then to twist or burn off the free portion, using styptic cotton, if necessary, to allay the hemorrhage. If the tumor be sessile and flattened, it may be scraped out with the curette. For polypi



which are attached within the meatus the antral snare is often very efficient. If the tumor is large and vascular, a needle armed with a double ligature should first be passed through the base, and double ligation be followed by immediate excision. With tumors more deeply situated or near the vesical orifice, the urethra may be dilated and the tumor removed by simple torsion, or possibly with snare or eurette. Large tumors must be removed by vaginal urethrotomy, a slit being made in the urethro-vaginal septum, through which the tumor can be everted and removed without further difficulty; and in general this method is to be preferred for all growths which are not in the immediate neighborhood of the meatus.

With all tumors it is best to cauterize the base after removal, and with angiomas this must be especially thorough if recurrence is to be prevented. Here, again, the Paquelin cantery is probably the best agent; but the apparatus is not always obtainable, and pure nitric acid is, fortunately, scarcely inferior: a small bit of cotton should be twisted around the end of a wire, wrung out in water, and dipped in the pure acid; it is then applied to the raw surface for about one minute, and afterward neutralized by a saturated solution of bicarbonate of soda. Sealing with a red-hot wire is also quite effectual, while the weaker caustics, such as nitrate of silver and carbolic acid, are to be considered inadequate. Sometimes the hemorrhage after the removal of these growths is quite considerable: it is usually checked at once by the cantery; if not, the pressure of a speculum will sometimes avail, or, still better, a small glass tube may be inserted and a little styptic cotton packed in around it; when these fail the vagina should be firmly tamponed, the pressure of the plug being usually an effective safeguard against further bleeding. It is not to be forgotten that the blood may, in exceptional cases, find its way into the bladder, instead of outward through the meatus, and thus a persistent hemorrhage be entirely overlooked; the urine should therefore be watched. In cases where no operation is permitted the application two or three times a week of pure chromic acid, in solution or fused into the end of a probe, is not very painful, and will sometimes cure.

#### § 4. FOREIGN BODIES IN THE URETHRA.

These may enter the urethra from the bladder or be introduced from without, or, in rare instances, develop in the urethra itself. Winekel relates a case where a calculus 8 cm. long and 10 cm. in circumference had formed in the urethra around the end of a needle which had been introduced from the vagina. For an enumeration of the various substances which have been introduced into the urethra or passed through it in either direction reference may be had to the section on

**Foreign Bodies in the Bladder.** Anything in the latter, except bodies of very considerable size, may be expelled through the urethra or become fixed in its course and cause obstruction. Calculi of even several inches in diameter, hydatid cysts, foetal bones, and vesical polypi are among the things which have been known to escape through the urethral canal.

The **SYMPTOMS** of a foreign body in the urethra are those of irritation and obstruction, in addition to which there may be hemorrhage from injury of the urethral wall. Later, a urethritis is set up, with possibly ulceration and perforation or periurethral abscess.

The **DIAGNOSIS** of a foreign body is made by vaginal touch and the sound where no reliable history can be obtained.

**TREATMENT.**—Removal may be effected in some cases by artificial dilatation and forceps, aided by one or two fingers in the vagina, or a wire doubled like a hairpin may be bent at its end so as to hook down any small body of moderate size and smooth surface. A large calculus which has only partially engaged in the vesical orifice should be pushed back, to be afterward extracted by the ordinary method of dilating with vesical calculi. Any body already through the sphincter, which cannot be easily removed through the meatus without urethral laceration, should be extracted through a urethro-vaginal incision: this may be immediately closed, or in case of urethritis it may be left open to ensure more thorough drainage and facilitate subsequent treatment.

### § 5. NEUROSES.

Improved methods of exploration have shown that the neuralgia and spasmodic contractions of the urethra formerly considered as frequently idiopathic are nearly always results of some urethral lesion or of reflex origin. Cases are, however, now and then encountered which may be termed neuroses in default of better anatomical knowledge, where micturition is attended with pain, such as occurs with urethritis, and with considerable tenesmus. These symptoms are often exaggerated at the time of menstruation, and may disappear entirely in the intervals. We may attempt to relieve these patients by the various urethral suppositories containing cocaine or morphia, with belladonna or hyoseyamus, or by rectal injections of chloral hydrate. Meanwhile, hot vaginal douches should be employed. Occasionally a faulty urine, containing too much uric acid, needs only to be corrected by diluents and salts of lithia or antidyspeptic remedies in order to give relief. It is, however, the general condition of the patient which should receive chief attention, and in addition to the usual tonics general galvanism is to be warmly recommended as being one of the most useful means at our command for re-establishing the tone of the nervous system. There

will usually be found to be some source of reflex irritation of the bladder, and this is of course to be removed as far as possible; still, the pain will often persist in spite of such removal, and permanent cure is not to be anticipated until the general health has been at least partially restored.

#### IV. DISEASES OF THE BLADDER.

##### § 1. ANOMALIES OF FORM AND OF POSITION.

##### 1. DISLOCATIONS OF THE BLADDER.

The bladder may be pushed or drawn in almost any direction out of the position which it usually occupies. Two forms of vesical dislocation will, on account of their special significance, be separately described—viz. cystocele and inversion of the bladder: first, however, some of the other more common varieties may be briefly alluded to.

1. A malposition occasionally results from abnormal conditions within the bladder, such as calculi, tumors, or an excessive amount of retained urine. More often the causes of dislocation are to be sought, external to the bladder, in some malposition or lesion of the neighboring organs: the most common of these is the gravid uterus. In the first months of pregnancy the uterus simply falls a little forward as its body increases in weight, so as to cause a slight indentation of the posterior vesical wall. Then as the uterus grows still larger, so that the pelvis can no longer contain it, and it becomes an abdominal organ, the bladder is again relieved of the weight. Later, with the onset of labor and the upward retraction of the cervix uteri, to which the posterior vesical wall is quite closely attached, the vesical orifice is often drawn up to such an extent that it can only be reached by a long male catheter. Here the bladder is flattened out between the uterus and abdominal wall, so that it often contains but a few ounces of urine, in spite of the very considerable dimensions which it seems to have on palpation. An ovarian cyst or large fibroid may draw up the bladder in the same way, and the same retention of urine, from doubling of the urethra upon itself, has been known in several cases to follow the puncture of a large ovarian cyst as follows the shrinking after delivery of the emptied uterus.

Among the sources of increased pressure upon the bladder, the most serious is retroversion of the gravid uterus. In this condition the cervix uteri is tilted up behind the pubes, so as to cause partial or complete occlusion of the vesical neck; the resulting retention of urine and overdistension of the bladder is one of the most common sources of diphtheritic cystitis. The summit of the bladder is displaced not only upward, but backward, so as to partially lie upon the retroflexed uterus.

Malpositions of the non-pregnant uterus, either by direct pressure, as in anteversion and prolapse, or by traction at the vesical neck, as in retroversion, are common causes of vesical displacement. All sorts of uterine tumors, fibroids, hæmatoma, cancer, also perituterine inflammation or hæmatocele, may have the same effect. A fecal impaction in the rectum or sigmoid flexure may cause an indentation of the vesical wall, which, on examination through the dilated urethra, appears like a veritable tumor of the bladder itself; so with ovarian and parovarian tumors or a vaginal tampon or pessary. The bladder may also become adherent to the uterus, ovaries, or intestine, and thus be drawn and pulled upon in various directions; it may even form a part of the contents of a hernial sac.

The SYMPTOMS of these different dislocations vary greatly according to the degree of displacement and certain other factors which are not perfectly understood. If there is any dragging at the vesical neck, there is almost invariably an increased irritability of the bladder which manifests itself by increased frequency of micturition, and in some cases tenesmus, but when there is only moderate pressure upon the bladder from an anteverted uterus, a pelvic tumor, or the like, there is sometimes irritable bladder and sometimes no vesical disturbance whatever. It is very doubtful if a dislocation of the corpus vesicæ alone, without any change in the position, tension, or blood-supply of the vesical neck, is sufficient of itself to cause irritable bladder: that which attends the beginning of pregnancy has been alluded to, but here there is not only a pressure from the growing uterus, but also a marked alteration in the circulation about the vesical neck—a temporary predisposition, as it were, to congestion and inflammation. Complete retention of urine as a result of vesical dislocation is of rare occurrence, except with retroversion of the gravid uterus: this will be again referred to in speaking of the etiology of cystitis.

The DIAGNOSIS and TREATMENT of vesical dislocation must depend entirely upon the recognition and removal of the exciting cause. Usually, vesical irritation, which is the most prominent symptom of dislocation, is only one of a group of symptoms which have a common origin in a dislocated uterus, a pelvic cellulitis, hæmatocele, or the like; and these can only be discovered by a thorough examination of all the pelvic organs. Still, frequent micturition is often the chief complaint made by the patient in such cases, and it is important to recognize the actual cause, and not waste time with diuretics and other internal remedies when, for instance, a well-fitting pessary will give immediate relief. The pressure of the anteverted gravid uterus may sometimes be removed by a hypogastric belt. Toward the end of pregnancy a faulty position of the fœtus may cause an arm or shoulder to press upon the bladder; and this condition may sometimes be remedied by external manipula-



tion of the fœtus. Retention in the early months of pregnancy should always arouse suspicion of a retroverted uterus, and lead to timely recognition and correction of the malposition.

## 2. CYSTOCELE VAGINALIS.

In this condition a part, and in some cases the whole, of the bladder is prolapsed or everted through the vaginal outlet. It may occur suddenly in consequence of violent expulsive efforts, such as accompany childbirth, but usually it is of slow development. As a rule, the bladder itself is not at fault, or at most merely predisposed to prolapse. Any straining effort, such as attends constipation, or prolonged fits of coughing, or severe vesical tenesmus, must favor the formation of a cystocele. Vesical calculus also, or vesical tumors, may occasionally, on account of their weight, be predisposing factors. The most important cause is unquestionably a loss of the perineal body, which permits a rolling out of the vaginal tissues, and a consequent dragging upon the parts to which they are closely attached. Attention has already been called to the more or less intimate union of the anterior vaginal wall to the fundus vesicæ; and it is easy to see how a sagging of the former would result in the formation of a constantly enlarging vesical pouch. Still, this sagging does not always follow a loss of the perineum, and a further cause for its occurrence is to be sought in a subinvolution of the vagina and too early rising from confinement before the parts about the introitus have regained their normal dimensions and tone.

Cystocele may exist alone or as a part of a procidentia; in some cases the cystocele precedes the uterine prolapse; more rarely the anterior vaginal wall, and with it the bladder, is dragged down by the prolapsed uterus. Still, cystocele is not a necessary consequence of procidentia, which may even be complete and yet the bladder retain its normal position; this seemingly impossible condition is brought about by the gradual stretching of the vesico-uterine and vesico-vaginal attachments.

Cystocele may occur at almost any age, but since it is in nearly every instance a result of childbirth, it is extremely rare before puberty: Bourdon, however, found it at the age of fourteen, Cooper at seventeen, and Markoe in a child of only four years: the latter was an acute case, and represented a true hernia vesicæ vaginalis in consequence of straining at stool. The degree of vesical prolapse may vary from a small pouch hardly visible at the vaginal orifice to a tumor the size of a fœtal head which lies outside the vulva and represents the completely inverted bladder. Meanwhile, the urethra may retain its normal position, or its vesical orifice may, on the other hand, be so completely prolapsed that the usual relative position of its two extremities is almost reversed, the vesical orifice being, in the erect posture, considerably anterior to

the meatus. (For a more complete account of the complications from the side of the uterus and rectum the reader is referred to the article of this work on Procidencia.) In most cases of cystocele the uterus is not much lower in the pelvis than usual.

The SYMPTOMS of the acute form are a sensation of great stretching and tearing at the vulva, such as occurs at the termination of labor, with sometimes a feeling of tension at the umbilicus. Most of these cases have occurred during labor, when the resulting symptoms would not be so noticeable; it is, however, an unusual accident. In the chronic form the symptoms are more manifold, but it will be sufficient here to mention only those which are purely vesical. Micturition may be quite free and natural in spite of considerable prolapse; oftener it is very frequent, even two or three times hourly. The bladder is emptied with much difficulty and straining, and often the patient is obliged either to assume the genu-pectoral position or to push back the tumor into the vagina before micturition can take place. Occasionally the cystocele is complicated with cystitis, but much less frequently than would naturally be expected to follow the almost unavoidable retention of a certain amount of urine in the sac; Winkel, for instance, did not encounter one case of cystitis among sixty-eight of cystocele, and with other authors also the proportion of cases thus complicated seems to have been very small. The formation of a calculus in the sac is also rare. Inflammation and excoriation of the vaginal surface of the tumor, exposed as it is to chafing from the clothing and other sources, together with dragging pain in and about the tumor, especially when its vesical wall is inflamed and ulcerated, attend this as well as other forms of vaginal prolapse.

DIAGNOSIS.—An uncomplicated cystocele forms a soft elastic tumor, not especially tender on pressure unless inflamed, increased in volume when straining efforts are made, and usually reducible after catheterization or disappearing entirely of itself when the recumbent posture is assumed. The latter fact often makes it necessary to examine the patient while standing, in order to determine the full extent of the prolapse, or even in some cases its existence; or the same effect may be produced if the patient makes a straining effort, as when at stool. The catheter must be passed at least an inch before urine flows, and its beak can then be carried to the most dependent part of the cystocele, where it can be easily felt. A certain amount of urine is nearly always retained in the sac, as may be shown by catheterization immediately after micturition has taken place. These characteristics are so marked that it seems hardly possible to mistake such a tumor for anything else; still, in an acute case occurring during labor it has been taken for the bag of waters; and it has also been punctured under the impression that it was a hydrocephalic head. Such blunders are only possible

when the examination is cursory and there is ignorance of the fact that an acute cystocele may complicate labor. In all cases the catheter or the sound is the most reliable means of diagnosis.

Cystocele of recent development and uncomplicated by uterine prolapse is completely curable. When of long standing it can also be relieved in most cases, and even where the degree of uterine prolapse is considerable the prognosis is by no means hopeless.

**TREATMENT.**—In an acute case reposition of the prolapsed tissues, with a vaginal tampon if necessary to hold the parts in place, and rest in bed, are usually sufficient to prevent any recurrence. In chronic cases the first question of treatment will be as to the presence and extent of complications. If, luckily, there are none, if the perineum is nearly or quite intact and the cystocele small, it may sometimes be induced to retract by the use of vaginal douches of hot water; and these should be continued for at least a month before resort is had to other measures. If douching fails, one of the various pessaries may serve to keep the bladder in place; and of these Skene's is to be highly recommended, also Emmet's modification of a Hodge. Chronic cystitis, if present, should be cured before any operation for the cystocele itself; and here the formation of an artificial vesico-vaginal fistula at the most dependent part of the tumor is usually the means to be adopted at once as the surest and most satisfactory. For the more aggravated forms of cystocele it will usually be necessary to do perineorrhaphy and kolporrhaphy, and perhaps supplement these operations by the fitting of some mechanical support for the uterus and vagina. (For a description of these operations and the various pessaries which may be used in *Procidentia* the reader is referred to the article on this subject.)

### 3. INVERSION OF THE BLADDER.

This form of vesical prolapse, where the summit of the bladder, which in the empty state lies directly upon the internal urethral orifice, has become inverted through the latter so as to appear at the external meatus, is an extremely rare occurrence. Only two or three cases in adults have been reported, while in children the number of observations is somewhat greater. It is sometimes of acute origin, brought on by a fit of coughing or by straining at stool or micturition, or in children by crying. More often, however, it develops slowly, gradually dilating the urethra, until at last a tumor appears at the meatus, which recedes between the straining spells, but in time becomes larger and larger, until perhaps the whole everted bladder lies at the vulva. Here also, as in the acute form, the exciting cause is to be sought in a series of violent expulsive efforts. Some authors have thought it necessary to suppose a congenital laxity or perhaps malformation of the urethra;

still, the children in whom this condition has been found have been otherwise well formed, without vaginal atresia, double clitoris, or other evidence of epispadias. In the only two cases of adults where the cause was stated the prolapse occurred suddenly, once in labor and once in the course of an acute cystitis.

**SYMPTOMS.**—When the vesical wall is prolapsed for only a short distance into the urethra, but not so as to appear at the meatus, it is said to cause symptoms like those of calculus; such a condition might perhaps be recognized with the aid of a sound if its possibility were borne in mind. Complete prolapse in adults gives rise to considerable abdominal pain and straining, but in children it is the presence of a tumor at the vulva which first calls attention to the condition. This is usually about the size of a walnut, and occasionally as large as an orange: it is somewhat pyriform in shape, and more or less pendulous, so that its base is directed toward the perineum. The tumor is sometimes soft, again tense and elastic, or even quite hard and unyielding; it is of bright-red or scarlet color, and its surface moist and slippery or occasionally granular and phosphatic, and not very tender to the touch. In children it will often be seen to enlarge and become of deeper color when the child cries or strains. On lifting the tumor so as to expose its under surface, the two orifices of the ureters may usually be found on careful search, and urine may be collected from either by the use of a small catheter. In some cases, but not invariably, the urethral ring surrounding the neck of the tumor may be seen, and a probe passed through it on either side of the tumor to the vesical orifice. The prolapse is almost invariably reducible, and usually the tumor slips back easily through the urethra without requiring any prolonged manipulation. If the prolapse is of long standing, the constant escape of urine and its contact with the skin of the vulva and thighs result in an inflammation of these parts; they may become eroded, or even ulcerated and coated with phosphatic deposit, as in cases of vesico-vaginal fistula.

**DIAGNOSIS.**—Inversion of the bladder must be distinguished from urethral prolapse and from urethral or vesical polypus. Urethral prolapse is rarely if ever so large as the tumor found in cases of inversion; it has no pedicle, and its surface must of necessity be continuous in part with that of the vestibulum. A urethral polyp is irreducible, of slow growth, rarely so large as to conceal the meatus, is not kept moist by the constant trickling of urine, and its attachment to the urethral wall can usually be demonstrated with a probe. A prolapsed vesical polyp would present much the same appearance as an inverted bladder, and could likewise be pushed back through the vesical orifice; but once within the bladder the diagnosis would be clear, since the polyp could still be felt as an outgrowth from the vesical wall.

**TREATMENT.**—The first indication is to replace the prolapsed blad-



der. For this purpose the fingers should be well oiled, and reduction attempted by means of taxis, as in intestinal hernia. This is not usually difficult, but in some cases it may be necessary to push back the prolapsed portion on the end of a large sound; still, this is done at the risk of more or less injury to the part, and may generally be avoided. After reposition the recumbent posture must be kept for several days, and in children a pad and T-bandage may be applied to prevent the possibility of relapse. Meanwhile, the constipation or other source of violent straining must receive appropriate treatment. After reposition the urethral canal is found much dilated, admitting, even in children, the little and sometimes the middle finger. Incontinence is therefore to be anticipated in a certain proportion of cases, and if permanent the dilatation must be treated in the usual way, without, however, much prospect of cure.

## § 2. DISTURBANCES OF NUTRITION.

### 1. HYPERÆMIA.

An active congestion of the whole vesical mucosa does undoubtedly occur at times, and give rise to a passing irritability of the bladder, which may soon disappear of itself or be the precursor of vesical catarrh. Such congestion is often met with in the cadaver—not, however, as a diffuse redness, such as probably exists *intra vitam*, but as an injection of the individual vessels. Passive hyperæmia also may accompany affections of the heart or other disturbances of the general circulation, and often results in capillary hemorrhages and the formation of numerous punctate ecchymoses in the vesical mucosa. In the absence, however, of any well-marked clinical features which distinguish the various degrees of hyperæmia from the reflex disturbance known as irritable bladder, attention is called only to that peculiar form of chronic passive hyperæmia which is confined to the vesical neck, or, more strictly speaking, to the vesico-urethral junction.<sup>1</sup>

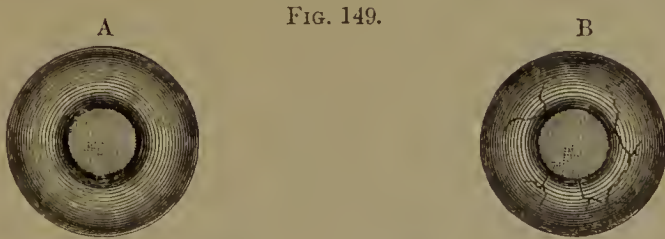
This rather uncommon affection is found chiefly in women of neurotic type, and more especially in connection with the group of symptoms which goes under the name of spinal irritation. Habitual constipation, prolonged retention of urine, vesical tenesmus, frequent coitus, and inflammation of the bladder and urethra, are the conditions which seem at least to favor its development. It is perhaps occasionally acute, but all the cases thus far observed have been chronic, and only this form will be described.

SYMPTOMS.—The most prominent symptoms on the part of the urin-

<sup>1</sup> *Vide* Author's pamphlet: "Hyperæmia of the Vesico-urethral Membrane," *Gynecological Trans.*, vol. vii., 1883.

ary organs are very urgent and frequent micturition, attended by painful tenesmus of the vesical detrusor and sphincter. The bladder must be emptied every half hour, or even oftener, both day and night: the calls to micturate are so imperative that either a urinal must be worn or the patient must remain where an opportunity for relief is always available. The clonic spasm of the sphincter renders micturition extremely painful at times, and the stream is jerky and interrupted. The general health becomes of necessity greatly impaired, owing to the confinement of the patient within-doors, the constant pain, and the loss of sleep; and the nervous system, already more or less abnormally sensitive, becomes eventually a complete wreck. The urine usually remains clear, but may sometimes undergo great fluctuations in density, and contain oxalates or an excess of phosphates, as is common with hysterical individuals.<sup>1</sup>

These symptoms bear a great resemblance to those of cystitis and of fissure of the vesical neck. The former may in most cases be excluded by a urinary analysis, but from fissure this condition of hyperæmia can only be distinguished by means of the endoscope. In both affections vaginal touch as well as the vesical sound discloses a marked hyperæsthesia at the seat of disease; the introduction of the latter causes the most intense pain when the vesical orifice is reached, and the instrument is grasped by the irritable sphincter with a force which only patient waiting will overcome without serious injury to the tissues. For the same reason the endoscope can only be used when the patient is under ether. The picture which this instrument affords is that of a few tortuous veins upon an otherwise healthy membrane: this appearance is well shown by the accompanying cut, of which A represents



Healthy Vesico-urethral Membrane.

Hyperæmia of the Vesico-urethral Membrane.

the uniform rose-red tint of the normal mucosa, and B the condition of hyperæmia. The views are taken just at the moment when the rounded end of the endoscope is entering the bladder, the disk in the centre representing a portion of the vesical summit, which, the bladder being empty, falls against the end of the instrument. The condition is thus seen to be quite distinct both from the much more pronounced and

<sup>1</sup> Ultzman: "Ueber Pyurie (Eiterharnen) und ihre Behandlung," *Weiner klinik*, 1883, ix. 1-16.

swollen veins of varix and from the more uniform hyperæmia and thickening of a local inflammation. That the vessels seen are venous is probable from the constant absence of pulsation. It is evident that nothing but ocular inspection can distinguish this condition from fissure in the same locality, and the diagnosis is all the more important because of the absolute variance in the treatment of these two affections.

If the case be of recent origin, palliative treatment may be tried in the form of rest in bed, mild cathartics, diluent drinks, hot vaginal douches or sitz-baths, and opium suppositories or injections of chloral hydrate. As a rule, however, opium is to be used with great reluctance: there is the same danger of the opium habit as in cases of cystitis, and the slight rest thus afforded to the vesical neck has proved of no curative influence whatever in the cases of this affection thus far observed. When the hyperæmia is chronic, there is only one mode of treatment which has proved effectual, and that is the formation of an artificial vesico-vaginal fistula—the only method of procuring complete rest for the vesical orifice. A description of this operation and the subsequent management of the fistula will be found under the Treatment of Cystitis. After the fistula has been made the hyperæmia should receive direct treatment in the form of daily douches of hot water at a temperature of 105°–110° Fahr.; these may be conveniently given by means of a fountain syringe with a short nozzle, which enters the urethra only as far as the vesical sphincter, through which the stream will easily force its way. As in cystitis, it is all-important that the patient should be able to go about in the open air, and this may be made possible by a well-fitting urinal. The general health then becomes gradually restored, the nervous system regains its former tone, and then, but not before, the fistula may be closed in the usual manner.

## 2. CYSTITIS.

Inflammatory conditions of the bladder may be variously classified as acute and chronic, according to their duration; as local and general, according to the extent of surface involved; as catarrhal and parenchymatous, according as the process is limited to the mucosa or extends into the deeper layers; as muco-purulent, purulent, and gangrenous, with respect to the character of the secretion; and, finally, two special forms are called croupous or diphtheritic, according to the character of the false membrane which is their distinctive anatomical feature.

It is found most convenient from a clinical standpoint to consider these different forms together, since they are more or less associated in each individual case of cystitis, and have, generally speaking, a common etiology.

PATHOLOGICAL ANATOMY.<sup>1</sup>—In acute catarrh the mucous membrane is reddened, swollen, and usually bathed in pus; there may also be signs of recent hemorrhage. After the inflammation has become chronic the alterations are more varied. The ingestion may still be general, but often it is confined to certain spots. The mucosa may be uniformly thickened or the hypertrophy may take the form of multiple polypoid growths. The color of the membrane may be brown or even black, or variously spotted as a result of numerous ecchymoses which have undergone subsequent pigment metamorphosis. Erosions, and even deep ragged ulcerations, are not infrequent. Especially noticeable is in most cases the extreme thickness of the vesical wall, which is partly inflammatory, partly a true muscular hypertrophy as a result of the long-continued over-action of the bladder. When, however, the cystitis has followed vesical paralysis, the walls are found quite thin.

In the phlegmonous or parenchymatous form of cystitis the vesical wall is stiffened and infiltrated with inflammatory products. There may have been suppuration and formation of an abscess, which may have opened either into the vesical interior, and thus formed a deep ragged ulcer with undermined edges, or the pus may have penetrated into the cellular tissue about the bladder, and eventually pointed in the vagina or broken into the adherent intestine, or even into the peritoneal cavity. Such events are, however, of very rare occurrence, and almost entirely confined to the diphtheritic variety. A simple adhesive inflammation of the vesical serosa—a pericystitis—is not so uncommon.

The croupous and diphtheritic forms are characterized anatomically by the formation of a false membrane, which in the former simply lies upon the vesical mucosa, while in the diphtheritic variety the membrane consists of the infiltrated and necrotic tissues themselves. These forms begin as localized hemorrhagic patches in the region of the trigonum which soon become covered with gray or grayish-black membrane. These membranes may become wholly or partially loosened, so as to leave behind several small ulcerations, or they may increase in size and become confluent until the whole vesical surface is covered with an unbroken membrane which may later be exfoliated in the form of a more or less complete cast of the vesical interior. Such casts may be as large as a child's head: they represent in some cases simply the vesical mucosa; in others a good part of the muscularis is likewise exfoliated; and two cases are reported in which even the peritoneal coat was involved in the necrotic process, and a portion of this membrane was found adherent to the cast: this must have resulted from a partial inversion or pitting-in of the whole thickness of the vesical summit, with formation of adhesions at the neck of the pouch thus formed, and subsequent sloughing of the inverted portion. Croupous as well as

<sup>1</sup> Ziegler: *Birsch-Hirschfeld*.



diphtheritic inflammation may result in the formation of a vesical cast, but here the wall of the bladder remains intact, or loses at most its epithelial layer. The interior of any cast may feel as if covered with sand, owing to a deposit of urates; the same may also occur upon any erosion or ulceration of the vesical wall. The exterior of the bladder in these cases of croupous and diphtheritic cystitis is often found covered with a purulent or highly offensive exudation.

As a form of ulceration now and then found in the bladder, and having no connection with those already described, is to be mentioned the perforating ulcer first noticed by Rokitsansky. It is quite similar in its pathological appearance to *ulcus rotundum* of the stomach.

ETIOLOGY.—Certain conditions both local and general exercise a marked predisposing influence upon the development of cystitis, and prominent among these is the puerperal state. At the beginning of pregnancy the vessels of the growing uterus become greatly enlarged; and this can hardly take place without a partial increase also in the blood-supply of the vesical neck. Then, again, after delivery the sudden collapse of the emptied uterus must evidently cause a temporary collateral hyperemia of the bladder as well as other pelvic organs. These two periods, the first month or two of pregnancy and the first week following labor, are, in fact, not infrequently attended by cystitis, which now and then is of apparently spontaneous development.<sup>1</sup> Other predisposing conditions are menstruation and the menopause; it is by no means rare to find that micturition is somewhat more frequent during menstruation—a fact which would seem to indicate a slight congestion of the bladder at these periods. The serofulous diathesis probably favors the development of vesical as well as other forms of catarrh.

Among the various exciting causes of cystitis, the influence of mechanical irritation of the vesical wall is at once apparent. Such an irritation may proceed from within or from without the body, or it may originate within the bladder itself. Of those coming from within, some are brought by the urine in the form of gravel, or as an excess of urates such as occurs in lithiasis, or as pus from the kidney. Perforation of the bladder may give entrance to fecal matter and intestinal gases, to the contents of a suppurating cyst, an extra-uterine foetal sac, or a parametric abscess. From without the body irritation may come in the shape of foreign substances, such as are often introduced by hysterical women, or from instruments inserted into the bladder for catheterization or operative purposes; also as direct trauma from falls or blows upon the bladder, or from violent coitus, or operative procedures in the vagina, and, especially during labor, from the long-continued pressure of the advancing head. The causes which originate within the bladder itself.

<sup>1</sup> Monod: "Cystitis chez la Femme, etc.," *Ann. de Gynec.*, 1880, 13, p. 167.

are vesical calculi and neoplasms, with both of which sooner or later catarrh is pretty sure to develop.

Chemical irritation may be a cause of cystitis; the form which sometimes follows the external use of cantharides is well known. Certain ethereal oils, tars, and balsams, such as turpentine and the balsams of copaliba and tolu, sometimes produce, when taken internally, the same irritating effect. Sour wines and young beer seem in some cases to exert at least a favoring influence upon the development of acute vesical catarrh. Again, chemical irritants may be introduced through the urethra for purposes of urethral or vesical medication or by mistake: Thomas has seen, for instance, a catarrh follow an intravesical injection of a 2 per cent. carbolic solution which was supposed by the nurse who gave it to have entered the vagina.

Vesical catarrh may furthermore result from the direct extension of affections of the neighboring organs. Frequent reference has already been made to the occasional implication of the bladder in certain diseases of the urethra. Perituterine cellulitis may involve the cellular tissue about the bladder, and eventually penetrate the vesical wall. Certain constitutional affections—notably, the exanthemata, puerperal fever, typhus, and cholera, occasionally also dysentery and typhoid—may be complicated by a cystitis which represents simply a local manifestation of the constitutional disease.

All the sources of cystitis hitherto mentioned are to be regarded as exceptional and of inferior importance as compared with two others which still remain to be considered—viz. the ammoniacal fermentation of retained urine and infection with unclean catheters. The exact relation of the alkaline fermentation to cystitis and to the introduction into the bladder of infectious germs still remains unascertained. While some contend that fermentation is impossible without bacteria, and that the cystitis is merely the result of the chemical irritant set free by the decomposition of urea, others regard the fermentation as a process which simply puts the vesical wall into a condition favorable to bacterial invasion. At all events, it is certain that these three factors, retention, catheterization, and fermentation, precede a large proportion of those cases of vesical inflammation which arise in connection with the puerperal condition, and, more especially, with retroversion of the gravid uterus and the ischuria which follows delivery. These latter are the cases most apt to take on a gangrenous or diphtheritic character, and which have occasionally been followed by exfoliation of the whole vesical mucosa. It is not, however, to be understood that the mere act of catheterization is held responsible for these unfortunate cases; on the contrary, evacuation of the bladder is usually too long delayed, and when, at last, the bladder is artificially emptied, the fault lies not in the catheterization itself, but in the imperfect method which is usually adopted.

The use of dirty instruments, the lack of all precaution in regard to the entrance of air into the bladder, and the carrying in upon the catheter of lochial discharge, have undoubtedly in many cases furnished the already susceptible vesical interior with infectious germs. The same forms of acute cystitis may also follow complete retention from sources other than those connected with the puerperium. Such are the various forms of urethral obstruction from calculi, stricture, and the like; vesical paralysis from whatever cause; the retention of hysteria; and, in some cases, voluntary retention because of painful micturition.

Besides the cases of acute retention and subsequent acute cystitis, there are others where retention is only partial and the onset of cystitis is more insidious. This may occur when the obstruction from a stricture or neoplasm is incomplete and with vesical paralysis of gradual development; sometimes also with cystocele or other forms of diverticulum, and in consequence of the gradual thickening around the vesical orifice which follows long-continued vesical tenesmus. Here, again, ammoniacal fermentation and the improper use of the catheter play an important rôle; and whenever the former has taken place cystitis is not slow to develop. Sometimes this occurs without catheterization; and it would certainly appear that instrumentation is not the only means of access to the bladder which these micro-organisms possess: it will, however, always remain the most ready mode of entrance, and the one to be most carefully guarded by antiseptic precautions.

Nothing has as yet been said about the influence of cold upon the development of vesical catarrh; and this because it is probably of much less importance than it commonly seems. Considering the sheltered position of the bladder, and the comparative immunity of children from cystitis at an age which is otherwise eminently predisposed to catarrhal affections, it would seem very surprising if in the adult this condition of things should be completely reversed. At the same time, it is to be remembered that after puberty the blood-supply of the bladder is subject to much greater variation than in children, and that during labor the vesico-vaginal septum is at times directly exposed to atmospheric influences. Cold may therefore be now and then an exciting cause of vesical catarrh in adults, but it should never be accepted as the prime factor until every other possible source has been carefully considered.

**SYMPTOMS.**—The simplest form of acute catarrh, such as results from cantharides or trauma or irritating injections, comes on suddenly with increased frequency of micturition, more or less severe pain attending the act, and a sensation of weight and discomfort behind the pubes. There is always considerable tenesmus, but this varies in degree according to the extent to which the vesical neck is implicated. The urine has a normal specific gravity, is slightly acid or neutral, only moderately

clouded, and the sediment contains a somewhat increased quantity of leucocytes, without crystals of triple phosphate.

More commonly acute cystitis has a purulent character from the outset, but even then, in the majority of cases, the general disturbance is very slight. The hypogastrium is quite tender on pressure, and is the seat of considerable pain, which radiates into the loins and down the thighs. In many cases that follow labor where bacterial invasion may be presumed a severe rigor ushers in the attack, and the evening temperature may for several days reach a considerable height. A peculiarity of these cases is that in the morning the temperature is often normal, and the patient bright and hungry until evening, when the same rise to  $103^{\circ}$  or  $104^{\circ}$  occurs as on the day before.<sup>1</sup> As a rule, the lochia are inoffensive, and, except the cystitis, there is no sign of puerperal infection. The urine is pale yellow, or sometimes red from the presence of blood; it is of a highly ammoniacal odor, of alkaline reaction, and albuminous in proportion to the amount of pus. The sediment is very abundant, and consists almost wholly of pus, triple phosphate crystals, and bacteria, with some red blood-corpuscles and bladder epithelium.

The most severe and fatal forms of acute cystitis are those which have been anatomically described as the croupous and diphtheritic. We have already seen that these forms may occur as a local expression of other grave infectious diseases, or may be of purely local origin, as a consequence of long retention or the introduction of specific germs from without. If following labor, the disease usually comes on immediately in the course of the first three or four days after delivery. It begins most often with a rigor, and this may be repeated at frequent intervals throughout the course of the cystitis. The fever runs high, the tongue becomes dry and glazed, and the whole condition of the patient is such as to indicate a grave affection. The urine is voided with great difficulty and pain, or the vesical orifice may be so blocked by membrane or shreds of tissue as to render micturition impossible. On the other hand, there may be incontinence if the bladder has been paralyzed by long distension or the urethra has become partially dilated by a membranous plug which has subsequently escaped. The hypogastrium is exceedingly tender, and the external genitals are sometimes covered with a fibrinous deposit. Catheterization may fail to empty the bladder even when the latter is evidently much distended and when frequent withdrawal of the instrument and inspections of its orifice make it evident that no plugging has occurred: this symptom has been noted in those rare cases where exfoliation of the whole vesical mucosa has resulted in the formation of a sac filled with urine—a second bladder within the first—which the catheter does not reach. The most marked characteristics of these forms of cystitis are to be found in the urine. The latter

<sup>1</sup> Richardson.



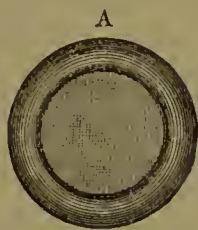
is thick and turbid, of a dirty-red or brownish color, and with an indescribably offensive odor which is said by Ultzman to remind at the same time of decaying flesh, sulphuretted hydrogen, and feces: this odor, however, is not peculiar to diphtheritic cystitis, but is found with any urine which comes from an ulcerated or gangrenous bladder. The sediment consists of countless bacteria, triple phosphates, and cellular detritus, the individual pus-, blood-, and epithelial cells having entirely disappeared under the influence of the alkaline fermentation. Shreds of false membrane and tags of necrotic tissue are often encountered, and occasionally large pieces of membrane, or even a complete cast of the whole vesical interior, may escape through the urethral canal: this is an event which occurs, if at all, in the third or fourth week of the disease, and is usually followed by a rapid amelioration of the patient's condition.

We are now brought to the symptomatology of chronic cystitis, an affection which surpasses almost any other in the amount of pain and misery which it may cause. It may be the outcome of an acute catarrh, but more often comes on insidiously in consequence of some long-continued source of vesical irritation. Frequent and painful micturition, followed by tenesmus, is the most prominent symptom. The patient is often obliged to sit almost constantly upon the vessel, or else wear some form of urinal which permits micturition at very frequent intervals. Only a few drops of urine collect in the bladder before the sense of painful distension and the desire to urinate become irresistible, and a teaspoonful perhaps of urine is then forced out, sometimes with the greatest difficulty owing to painful spasm of the vesical sphincter, and always with more or less suffering. At night, in the recumbent posture, there is little if any amelioration of the distress, and eventually loss of sleep and constant pain and worry begin to tell upon the general health. The appetite is lost, the patient becomes emaciated, and her features look worn and express great suffering. Finally, if no relief is afforded, the inevitable result is secondary disease of the kidneys and uræmia. This is, however, the work of years: it is astonishing how some women keep about year after year without yielding to their complaint and in the daily performance of their household duties.

The local examination in a case of chronic cystitis generally reveals a thickened and contracted bladder, which may often be felt through the vesico-vaginal septum as a hard, resistant tumor. The introduction of the sound causes great pain at the vesical neck, and sometimes hemorrhage; it is often grasped so tightly by the vesical sphincter that its withdrawal must be postponed until the muscles have partially relaxed. The depth of the bladder is found to be but 6-12 cm., instead of the normal 15 cm.; but for this purpose the sound must be gently used, in view of possible ulcerations which the instrument

might easily penetrate. The endoscope reveals a thick network of congested vessels in the vesical mucosa, instead of the pale rose tint of the normal membrane; possibly also polypoid hypertrophy or ulceration.

FIG. 150.



Healthy Bladder: membrane seen through the dilated urethra.



Chronic Cystitis: seen through the dilated urethra.

The urine varies considerably in different cases of chronic cystitis. When there is ulceration the urine may have the greenish-brown color and fetid odor which it has in diphtheritis. More often it is pale and of slightly acid, neutral, or highly ammoniacal reaction, according as it escapes frequently or is retained for some little time in the bladder. When ammoniacal it is more or less ropy from the well-known action of ammonia upon pus. Albumen is found in proportion to the amount of pus, and the latter, with epithelial cells, triple phosphates, and bacteria, forms an abundant sediment which is usually white, but not infrequently red or brown from the presence of blood.

**DIAGNOSIS.**—The careful examination of the pelvic organs, which the vesical symptoms will naturally lead to, will aid in establishing the cause of the cystitis rather than its presence. It is always of especial importance to know whether this may not be a calculus or new growth; hence the necessity for the careful use of the sound. The urethra, rectum, and uterus must also be closely interrogated, for we have already seen how often these organs furnish the source of vesical irritation. The urine, however, is the factor which has the greatest diagnostic value. There can be no catarrh without catarrhal secretion; hence a clear urine effectually disposes of the possibility of cystitis. If the urine is cloudy and contains pus or an excess of mucus, we must decide from which part of the urinary tract these come. Urethritis can hardly be mistaken for cystitis unless ocular inspection of the urethra be neglected: however, with cystitis pus never escapes from the meatus except at micturition, and the urine which is passed toward the close of micturition is more cloudy than that which first escapes. The chief features which distinguish a renal from a vesical affection are—the larger amount of albumen than can be accounted for by the amount of pus and blood; the presence of casts of the renal tubules; the absence of pain at micturition; and no greater frequency of the latter than can be accounted for by the quantity of urine secreted. When only the pelvis

of the kidney is diseased, the diagnosis is sometimes more difficult. The urine may be filled with pus and the bladder be quite irritable, but there will usually be a history of renal colic and of acute pain in the region of the affected kidney: the urine generally contains some casts, and sometimes a sufficiently large amount of pelvic epithelium to be of great assistance in diagnosis.

Croupous or diphtheric inflammation may be suspected if in a case of cystitis following long retention of urine or childbirth frequent rigors and hectic fever give evidence of a septic process, while the urine rapidly assumes a fetid character. If, in addition, portions of false membrane or tags of necrotic tissue are passed, the diagnosis becomes quite certain. Phlegmonous inflammation of the vesical wall, with formation of pus in the cellular tissue about the bladder, can only be recognized by the appearance of local œdema, tenderness, or fluctuation in the vesico-vaginal septum or behind the pubes.

PROGNOSIS.—A simple catarrhal cystitis of acute origin generally disappears in the course of ten to fourteen days, this more especially in those forms which follow mechanical or chemical irritation. In general, the duration will depend upon that of the exciting cause. Occurring in the course of pregnancy, the tendency of cystitis is to persist until the former is terminated; in some cases abortion is a direct result of the cystitis, and may cause its speedy cessation. Chronic cystitis of long standing is an exceedingly intractable disease. Even if there is no evidence of renal complication, no assurance of complete recovery should be given at the outset; indeed, interstitial changes in the vesical wall often preclude all possibility of the organ regaining its normal capacity and expulsive power. All forms of croupous, diphtheric, and gangrenous inflammation of the bladder demand an exceedingly grave prognosis; of nine cases collected by the author, three were fatal, but the mortality is probably much higher than this limited number of cases would indicate.

TREATMENT.—If the etiology of cystitis be borne in mind, the importance of prophylaxis will at once appear. Proper pessaries for uterine, vaginal, and urethral dislocations, recognition and treatment of fissures, hemorrhoids, lithiasis, and, in general, any form of reflex vesical irritation, are among the more common means by which it may be hoped to forestall the development of cystitis. Still more important is timely relief in all cases of retention, and the method by which this is accomplished. Dirty catheters have always been one of the most fertile sources of cystitis, and any catheter made in the usual way, with a window at some distance from the tip, cannot be kept clean: a residue of filth will always remain in the blind end of the instrument which no amount of antiseptic soaking or scrubbing will reach. Of course these means of cleanliness must be relied upon in many cases,

and it is hardly necessary to say that every catheter should be thoroughly washed, both internally and externally, in one of the antiseptic solutions before and after use. But in all cases where it is possible the patient should be provided with a new catheter; and Küstner<sup>1</sup> has practically demonstrated the possibility of doing this in nearly every case which demands catheterization. This surgeon has adopted the use of a catheter which consists simply of a straight piece of common glass tubing open and carefully smoothed at both ends. Thus every patient can be provided with a new and inexpensive catheter, which has the additional advantage of being easily and thoroughly cleansed; and since this practice has been introduced into the lying-in hospital at Jena hardly a case of septic cystitis has occurred. Almost equally good results have been attained at Halle by the use of an ordinary catheter which is attached to a fountain syringe, so that a stream of an antiseptic solution is made to flow through it during its introduction, and the entrance of air into the bladder thus avoided. A combination of these two methods is eminently practicable, and deserves to be generally adopted, especially in all cases where there has been long retention of urine and possibly ammoniacal fermentation. Moreover, the vestibulum should be carefully washed previous to catheterization in all cases where there is any possibility of septic infection, and the instrument should be introduced with the meatus exposed to view. When it is necessary to use a soft-rubber catheter, it should open at the end instead of by the usual eye; such a catheter can be more easily cleaned, and there is less danger of prolapse of the vesical membrane into the opening, and its subsequent strangulation and injury upon withdrawal of the instrument.

A case of acute aseptic vesical catarrh should receive at the onset only constitutional treatment. The patient should keep the recumbent posture—the diet should be bland and unstimulating, consisting chiefly of milk, and meats of all kinds be avoided. The bowels should be kept open by saline cathartics, and even a slight over-action is desirable as a mild form of counter-irritation. Hot sitz-baths several times a day give great relief from the vesical pain and tenesmus; and these symptoms are also to be relieved, if necessary, by some form of opium, preferably suppositories, or by chloral hydrate in the form of an enema, beginning with gr. xx in ʒij of starch-water, and repeating this, if necessary, three or four times daily. In appropriate cases a few leeches may be applied to the vesico-vaginal septum. Finally, the urine must be kept as dilute and as nearly neutral as possible, in order that it may be unirritating to the bladder. This is effected in part by an exclusive milk diet, in addition to which ʒj of infus. buchu, and, if the urine is acid, gr. xv of citrate of potassium, should be given every six hours.

<sup>1</sup> *Deutsche med. Woch.*, 1882, p. 293.



If the urine is alkaline, benzoate of ammonia should be substituted for the potash, beginning with gr. x every two hours, and increasing this dose, if necessary, until a neutral or slightly acid urine is obtained. The author considers the benzoate of ammonium a remedy of the greatest value in cystitis, and believes that by its timely use in the beginning of the affection the latter may often be cut short if not completely aborted. When a milk diet cannot be adhered to, the patient should drink large quantities of flaxseed tea, which may be made into the more palatable form of lemonade.

In cases which under this treatment do not speedily improve, and in all cases at the very outset when the cystitis is of septic character, the bladder must be washed out at frequent intervals. Any good apparatus for this purpose must comply with the following requirements: It must cause the least possible pain; it must be capable of thorough cleansing; the stream must not be too strong or jerky; no air must be permitted to enter the bladder; there must be means of exit for the injected fluid, together with portions of blood-clots or bits of tissue, such as are often present in diphtheritic and chronic cases; finally, the amount injected must be easily regulated, and it must be sufficient to reach all portions of the vesical cavity. Matters of convenience should be made entirely subordinate to those of cleanliness and antisepsis; hence stopcocks and double catheters, which are difficult to clean, should be avoided: moreover, with a double catheter the bladder is not thoroughly washed, as may be easily demonstrated by a subsequent washing with a single catheter and an ordinary hand-syringe. The following plan is recommended as being both simple and effectual: A straight glass tube, the size of a No. 20 French sound, open and carefully smoothed at both ends, is used for a catheter. Küstner has them made with the outer end slightly flaring, and ground upon the inside so as to receive and perfectly fit the ground-glass nozzle of the syringe: this is, however, quite unnecessary, since connection with the syringe can be quite as easily effected by means of a small piece of rubber tubing, which slips over the end of the catheter and receives into its other end the tapering glass nozzle of the syringe, such as can be readily extemporized from a small piece of glass tubing. Such an apparatus presents no corners for the collection of filth; it can be taken quite apart and be as thoroughly cleansed as is possible for any combination of tubes. A fountain syringe is the best form for ordinary use, since its flow is even and the force easily regulated.

To wash out the bladder the patient is placed upon the back over an ordinary bedpan. The catheter is then inserted while the stream is flowing, in order to prevent the possible admission of air. As soon as the catheter is in the bladder the nozzle of the syringe is removed and the urine allowed to flow until the bladder is nearly empty, when

the end of the rubber tubing must be tightly pinched between the fingers until the nozzle, with the stream turned on, is again inserted; or, still better, the free end of the tubing may be kept constantly under water, and thus the entrance of air during insertion and removal of the nozzle be made absolutely impossible. The amount to be injected at each time must depend upon the capacity of the individual bladder. The stream may in general be allowed to flow until a slight uneasiness in the bladder is felt by the patient: this rule is, however, subject to some limitation, since it is evident that in certain paralytic conditions this plan would only serve to further distend an already weakened bladder. According to Sir H. Thompson, not more than 60 gm. should ever be injected at once, while Ultzman uses 200 gm., and Winckel still larger quantities. Great judgment will be necessary in each individual case. Each washing, which should be repeated two to four times daily, is to be prolonged until the liquid comes away quite clear.

The injection may be astringent, antiseptic, or a simple dosage. In acute, and often in chronic, cases we wish simply to cleanse the bladder of irritating secretion, and for this purpose warm water to which has been added a small quantity of common salt, about 5j to the pint, is often sufficient; or a 3 to 5 per cent. solution of chlorate of soda or borax may be used when the secretion is particularly tenacious. We may also use antiseptics even in these simple forms on grounds of prophylaxis—either a 1:5000 solution of corrosive sublimate or a 10 to 20 per cent. solution of carbolic acid. Somewhat later, when the pain and tenesmus have subsided, it may be necessary to use astringents. Those most commonly employed are nitrate of silver of a strength of 0.1 per cent., gradually increased up to 0.5 per cent., a 0.5 to 1.0 per cent. solution of tannin, or a 0.1 to 0.3 per cent. solution of permanganate of potash. Before using the astringent the bladder should first be washed with warm water until free from secretion, and then 100 gm. of the medicated solution should be injected and allowed to remain for a few moments.

In septic cases attended with fever and a foul urine an energetic antiseptic treatment must be carried out from the very beginning. The chief indication, in addition to general symptomatic treatment, is to disinfect and thoroughly drain the bladder. In the worst cases it should be washed out with an antiseptic solution every one to three hours; and Fritsch<sup>1</sup> has been very successful in the constant drainage of the bladder through a piece of rubber tubing, which can be easily inserted through the urethra by gentle rotation until just barely inside the bladder, and then fastened, if necessary, by a stitch at the meatus: through this tube the bladder is allowed to drain, and is also irrigated

<sup>1</sup> *Frauenkrankheiten*, Braunschweig, 1881.

with a carbolic or sublimate solution every two hours. If, in spite of washing and drainage, the temperature in such a case continues high, the urine foul, and small pieces of false membrane appear, the urethra should be dilated in search of a more extensive exfoliation of the vesical mucous membrane. It may not be necessary to dilate to the full extent, since a portion of the membrane will sometimes protrude into one of the smaller specula so as to permit extraction with the forceps. If not, digital exploration should be made in the hope of emptying the bladder and of the improvement which has usually followed this event. Phlegmonous cystitis with formation of abscess must receive also the same local treatment as other forms of pelvic cellulitis.

Chronic cystitis is the form which will most tax the patience and skill of the physician. The constitutional treatment of chronic cystitis is quite the reverse of that which is to be pursued in the acute stage. The diet must be more strengthening, although, in general, wines, spices, and stimulating foods are still to be avoided. The patient should go out of doors and have plenty of fresh air and moderate exercise: a course of treatment which confines her to her bed for any length of time is to be unequivocally condemned. Opium should be rarely used; in no disease is the opium habit more easily formed than in chronic cystitis. Bromide of potassium in 30-grain doses repeated every four hours will sometimes relieve tenesmus, and in paraldehyde we possess a valuable drug for constant use in insomnia. The bowels must be kept free by Hunyadi water, citrate of magnesia, or other mild aperient. Digestion must be aided if need be, and iron, cod-liver oil, and other tonics will often prove valuable adjuvants in the treatment of this affection. In short, the general health must be improved and the patient must have sleep, good food, and fresh air—matters which are apt to be forgotten in the severity of local symptoms.

Nevertheless, local instrumental treatment of the bladder itself must form the main feature of any successful line of treatment. In some cases washing and astringent injections will prove sufficient: this method should first be tried in all the more recent and milder cases, but it is not to be long continued if it prove unavailing. The way in which this washing should be done has already been described. In general, somewhat stronger injections may be used than in the acute form, and if there is no sign of ulceration they may be thrown in with somewhat greater force: when a stream is simply siphoned into the bladder and out again through a double catheter, a large portion of the contracted vesical wall remains unwashed, and the desired end is not attained; on the other hand, too forcible distension of an ulcerated bladder may cause rupture: both these extremes must be avoided if the washing is to be effectual. The washing should be done twice a

day through a glass tube, or, if this be too painful for the vesical neck, a soft rubber catheter open at the end or a piece of ordinary soft-rubber tubing may be substituted. A weak antiseptic solution (carbolic acid 1 : 500, corrosive sublimate 1 : 5000) may be used at the outset, or one of the various astringents: all fluids should of course be injected warm.

If these mild injections fail, a stronger solution of nitrate of silver should be tried, which in many cases has proved very effectual. After thorough washing of the bladder, gm. 30 of a 3 to 5 per cent. solution should be injected and retained for a few seconds; and this application should, if necessary, be repeated in a week. The pain following the injection will usually be severe and require an opiate.

Dilatation of the urethra has been often recommended for chronic cystitis, and, though it can have no curative effect, the stretching of the vesical neck does undoubtedly relieve for a time the painful tenesmus and give the bladder longer periods of rest. If used for this purpose, it should fall short of the limits which may be safely observed in health, since under diseased conditions of the sphincter dilatation is much more apt to be followed by permanent incontinence.

Certain cases of chronic cystitis do not show any marked improvement under the treatment already described; and in such time should not be wasted in uncertain attempts with this or that drug which has been recommended for cystitis, while all this time, perhaps, the kidneys are becoming hopelessly diseased. For those cases the only prospect of relief lies in drainage of the vesical cavity, and thereby complete rest for the diseased organ. This may be effected by means of a catheter or by an artificial vesico-vaginal fistula.

1. *Self-retaining Catheters*.—The principal difficulty attending this method is the irritability of the vesical neck and its intolerance of any instrument. In some cases, however, this may be overcome, and it is worth while to make the attempt in the hope of avoiding the more serious alternative of vaginal cystotomy. Of the catheters specially devised for this purpose, that of Goodman is probably the best, except that it should be made a little more rounding at the tip, as shown in the figure; its curved shape and the enlargement at each end

FIG. 151.



Skene's Modification of Goodman's Self-retaining Catheter (Skene).

ensure its retention in the bladder. Instead of a catheter, a piece of rubber tubing eight to ten inches long may be used, one end of which



has several small openings like a drainage-tube, and lies coiled up within the bladder: the other end must be fastened to an abdominal band. Or a shorter piece of tubing may be passed just within the vesical orifice, and its other end stitched to the meatus, as advised by Fritsch. Either of these may be connected with a urinal which is worn strapped to the thigh. A catheter which is not borne at all at the first insertion will sometimes be retained for half an hour on the second, and so on, by the aid of opiates perhaps, until the bladder has become perfectly tolerant of its presence. Daily washing of the bladder must be continued through the catheter, which should also be removed every two or three days and thoroughly cleansed.

2. A far more practical and efficient method of draining the bladder, and one invariably adopted by the author as soon as the very mildest means of treatment have proved unavailing, is the formation of an artificial vesico-vaginal fistula. Emmet was the first to do this operation for the relief of chronic cystitis in the female, and its importance can hardly be over-estimated in dealing with intractable cases. Emmet advises that it be made as follows: The patient is etherized, placed in the Sims position, and the perineum well retracted; a sharply-curved sound is passed into the bladder, and its beak pressed against the septum, so as to protrude in the median line a short distance behind the vesical orifice: it is then cut down upon by the aid of tenaculum and scissors. The blunt blade of the latter is inserted through the opening into the bladder, and the incision prolonged 3 or 4 cm. in the direction of the cervix uteri. Care must be taken that the blade of the scissors really enters the bladder, since it is apt to penetrate the loose cellular tissue between the vesical and vaginal membranes, and thus the latter only is incised. The edges of the incision should then be cauterized, or the vesical and vaginal membranes united by a continuous catgut suture to prevent the fistula from closing; the same end may be furthered in a measure by instructing the patient to pass her finger into the opening every morning and night. Any troublesome hemorrhage at the time of operation may be at once arrested by passing a deep transverse ligature through the upper or lower angle of the incision, according to the direction from which the blood comes; any such measure will, however, be rarely demanded. Pallen<sup>1</sup> prefers to make the opening by means of the Paquelin cautery at a red heat, the tip being drawn slowly back and forth along the median line until the tissues are perforated; all hemorrhage is thus avoided and the permanent patency of the opening is assured. In whatever manner the fistula is made, the patient must keep in bed for a few days after the operation, and measures must be taken to collect the constantly-escaping urine. The edges of the fistula and the parts liable to urinary contact should be kept well

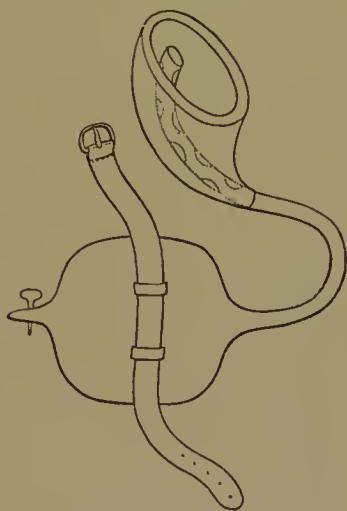
<sup>1</sup> *Am. Journ. Obst.*, xi. 269.

anointed with vaseline. As soon as any tendency to phosphatic deposit is noticed, the latter should be scraped away and the raw surface painted with a strong solution of nitrate of silver (20 to 60 per cent.). Twice daily the vagina and bladder should be thoroughly douched with warm water in the manner already described in speaking of hyperæmia of the vesical neck. Afterward some form of urinal is to be fitted, so that the patient can go about and have the benefit of fresh air and exercise. Skene's urinal is well adapted for some cases, the external soft-rubber urinal for others. Sometimes neither of these will answer, and trial can then be made of one which the author has devised, as figured in the accompanying cut. The upper or vaginal part consists of a cone of rubber sheeting with its base cemented to the circumference of an ordinary Meigs ring-pessary, while from the apex of the cone a rubber tube conducts the urine to a reservoir which is strapped to the thigh.

The fistula must be kept open in most cases for months. No thought of closure is to be entertained until pus and blood have entirely disappeared from the urine and the vesical interior has ceased to be sensitive to touch. Moreover, the patient must have regained a fair amount of strength, in order that the necessary operation may be well borne and union of the denuded surfaces be assured. The fistula is then to be closed in the usual way.

In some cases of chronic cystitis, after all inflammatory action has disappeared, micturition, though painless, continues to be very frequent, because of a diminished capacity of the bladder. The best way to try and overcome this insufficiency is to instruct the patient to always hold her urine for some little time after the desire to empty the bladder is felt. If this method of stretching the organ does not succeed, enough water to cause moderate discomfort to the patient should be daily injected into the bladder and retained for a few moments. The amount used each day may thus be gradually increased until the capacity of the bladder has reached a pint, and this favorable result may in most cases be confidently anticipated.

FIG. 152.



Urinal devised by Author.

### 3. FISSURE OF THE VESICAL NECK.

This lesion corresponds in every way to fissure of the anal sphincter. It occurs as a linear ulceration, 1 cm. or less in length, at the bottom

of one of the folds of the vesico-urethral junction. Its etiology is doubtful, but it probably originates in most cases in a small trauma, the injury being usually incurred during labor, artificial dilatation of the urethra, or the passage of a calculus. At other times it is observed to follow urethritis or cystitis, and begins perhaps as an abrasion which later becomes an ulcer in consequence of the excessive irritation at the vesical orifice which attends frequent micturition and tenesmus.

The SYMPTOMS of fissure are out of all proportion to the extent of the lesion, and proceed from the stretching of the sphincter at each act of micturition. The latter is attended with great pain at the vesical neck, and with a spasmodic contraction of the sphincter which makes the stream jerky and persists for some little time after the bladder is emptied. Micturition is also frequent in consequence of the irritation to which the vesical end of the fissure is constantly subjected by the urine. The painful tenesmus at the close of micturition may sometimes cause fresh laceration of the fissure and the escape of a few drops of blood from the meatus.

The DIAGNOSIS cannot be made by the rational signs with any degree of certainty, because of their great resemblance to the symptoms of cystitis and hyperæmia of the vesical neck. The urine must first be examined, of which all but the first few drops will be found clear. Vaginal touch will disclose a localized tenderness at the vesical neck. But the diagnosis must remain doubtful until by the aid of the endoscope the fissure is seen as a small grayish ulceration, with red, inflamed edges, at the vesical neck. Skene's endoscope is the best for this purpose, and the bladder should contain a small amount of fluid at the time of examination. Occasionally the fissure may be seen through one of Simon's specula, before the open end of which the folds of the canal close in as the instrument is slowly withdrawn. In some cases the introduction of the speculum makes the fissure bleed and gives it the appearance of a fresh tear. The use of any instrument is also extremely painful, and usually demands an anæsthetic.

The TREATMENT of fissure is, as a rule, completely successful, and the method which has thus far given the best results is artificial dilatation of the urethra. By stretching the sphincter, spasm is allayed, the urine can be detained for a longer time, and the fissure is given an opportunity to heal. Dilatation need not usually be carried beyond the fifth number of Simon's plugs. If this alone fails to cure, lapis mitigatus or the solid stick may be fused upon the end of a probe and applied directly to the fissure, the parts having been first thoroughly cleansed and care being taken to touch only the ulcerated surface. Or the base of the ulcer may be incised with a small knife which Skene has invented for this purpose. If then the symptoms still persist, the only thing which remains to be done is vaginal cystotomy in order to

drain the bladder through the fistula and give the sphincter complete rest. The cautery should not be used in this case, since the fissure will soon heal and a rapid closing of the fistula is desirable.

#### 4. HYPERTROPHY AND ATROPHY OF THE BLADDER.

(a) *Vesical hypertrophy* may occur under all circumstances where the organ is called upon to contract more frequently or more powerfully than under normal conditions. It is then purely compensatory, and as such is found with urethral obstruction, long-continued vesical tenesmus from reflex irritation, chronic cystitis, vesical tumors, and dislocations. It occasionally attends polyuria, as in cases of diabetes or interstitial nephritis. The hypertrophy may be either excentric or concentric, according as the vesical capacity is increased or diminished. The latter is more frequently found with cystitis and other affections where micturition is very frequent and the amount of urine small; while excentric hypertrophy occurs with obstruction and other conditions attended with moderate vesical dilatation. In either form the walls of the bladder are much thickened, chiefly from increase of muscular tissue. This increase may be evenly distributed throughout the whole organ, or it may be limited to the trabeculæ, which can often be felt with a sound, and between which the comparatively thin vesical wall may be dilated in the form of pouches or sacculæ: these may become so thinned as to consist of little else than a mucous and peritoneal coat, and they present favorable conditions for the stagnation of urine and the development of phosphatic calculi.

We have already seen that thickening of the vesical wall is not always a true muscular hypertrophy. Chronic cystitis is sometimes attended with a polypoid hypertrophy of the mucosa, or, again, with an interstitial hypertrophy which is purely inflammatory and greatly impairs the future usefulness of the organ.

TREATMENT.—Muscular hypertrophy will be rarely found without some complicating affection, of which it is itself merely a symptom, and against which treatment must be directed. Occasionally the hypertrophy may persist after the cause is removed, but it will then cause trouble only in so far as it affects the vesical capacity. If the latter is diminished, micturition will be too frequent—a condition of which the only means of relief has already been pointed out. If the vesical capacity is increased, this condition may be recognized by the use of the sound immediately after urine has been drawn, the depth of a normal bladder being only 15 cm. from the external meatus to the extreme summit. A dilated bladder favors partial retention of urine; it must therefore never be allowed to fill itself completely, and thus, if possible, be induced to resume its normal dimensions. If urine is retained after



each micturition, the catheter must be constantly employed by the patient herself.

(b) *Atrophy*.—It is only in connection with paralysis from over-distension of the bladder and from disease of the central nervous system that vesical atrophy is ever met with in the young. As a part of general senile atrophy all the vesical coats are often found very much thinned, and in some cases almost transparent. We shall again have occasion to speak of the various paralytic conditions in the section on Vesical Neuroses. If senile atrophy of the bladder prevents its being properly emptied, electricity should be applied by means of a vesical electrode and a faradic battery. If this fails, the urine must be frequently drawn with a catheter in order to secure complete evacuation of the bladder and prevent further distension.

## 5. TUBERCULOSIS OF THE BLADDER.

Vesical tuberculosis in the female is a very rare affection. When it does occur it is generally in connection with tuberculosis of the whole urinary tract, which begins usually in the kidney, possibly now and then in the urethra. It may also be secondary to general tuberculosis, and in very exceptional cases it is primary in the bladder itself.

The vesical interior may be simply sprinkled with miliary tubercles, or it may present at its base a few small superficial ulcerations with somewhat infiltrated edges, and showing nothing macroscopically which is characteristic of tubercle. In primary tuberculosis of the urinary organs there are more serious changes. At the base, and especially around the three orifices of the bladder, are numerous deep ulcerations with cheesy base and edges, often undermined and sometimes confluent, so that the whole or a greater part of the bladder seems to be covered with a thick cheesy layer. The parts not ulcerated are inflamed, hemorrhagic, and often sprinkled with miliary granulations.

The SYMPTOMS of this disease are precocious hemorrhage with polyuria, and subsequent development of a severe and intractable cystitis without apparent cause, and attended with unusual tenderness of the vesical base and neck. Hemorrhage may occur two or three years before there is any other symptom. Sometimes the origin of the trigonum, as felt through the vagina, is indurated and very sensitive to touch, while the vesical summit is soft and pressure behind the pubes quite painless.

The DIAGNOSIS is usually difficult unless tubercle bacilli are found in the urine. That they are usually present in the later stages is to be accepted as an established fact, but whether invariably, and how early in the disease, must be decided by further observation. Hemorrhage occurring early in an otherwise healthy woman from twenty to thirty-

five years of age, where vesical exploration fails to disclose either new growth or foreign body, should arouse a strong suspicion of tuberculosis. Moreover, the hemorrhage is quite different from that which accompanies calculus, being quite independent of physical exertion and often occurring in the night. If, later, chronic cystitis insidiously develops, with excessive tenesmus and a persistent blood-streaked urine, while the general health steadily deteriorates in spite of treatment, the diagnosis of tuberculosis is rendered quite certain. Often a physical examination of the lungs will reveal an incipient phthisis and materially strengthen the diagnosis.

The TREATMENT can only be palliative and symptomatic.

### § 3. VESICAL NEOPLASMS.

All vesical tumors, whether benign or malignant, have certain features in common. They all have a tendency to become pedunculated or polypoid, and hence the term "polypus" alone expresses nothing as to the histological character of the growth. The favorite seat of all vesical neoplasms is the neighborhood of the three vesical orifices, or, more generally speaking, the fundus. Any new growth acts as a foreign body, and eventually produces muscular hypertrophy and catarrh; phosphatic deposits are therefore frequent, either as calculi or as incrustations upon tumors or ulcerations. Any polypoid growth may make its way into or completely through the urethral canal, so as to appear externally at the meatus; this is not, however, of common occurrence. All varieties of vesical neoplasms may cause complete obstruction of one or both ureters and secondary degeneration of the kidneys.

Vesical tumors may be conveniently classified as follows:

1. Hyperplasia of the mucous membrane (mucous polypi);
2. Fibroma and fibro-myoma;
3. Papilloma;
4. Sarcoma;
5. Carcinoma.

1. *Hyperplasia of the mucosa* may be either local or general. Local hyperplasia occurs in the form of one or more mucous polypi, which are similar to those so often found in the uterus and rectum. They are soft, fleshy, pendulous growths, sometimes as large as a hen's egg, often glandular, and otherwise resembling in most respects the mucous membrane from which they grow. They are sometimes congenital.

General hyperplasia, also called polypoid hypertrophy, is nearly always a result of chronic cystitis. The mucous membrane may be uniformly thickened, or it may present numerous small elevations in the form of warty, fungous, polypoid, or cauliflower growths, composed chiefly of wavy connective tissue with an epithelial covering.

Both mucous polypi and polypoid hypertrophy of the bladder are rare.

2. *Fibroma* and *fibro-myoma* are, if anything, still more uncommon than hyperplasia; only one case of pure myoma has been met with in the female bladder. These tumors are sometimes soft, more often hard and dense, generally pedunculated, with a smooth or bosselated surface, and occasionally of considerable size. Their vascular supply is usually small.

3. *Papilloma, or Villous Tumor; also termed Papillary Fibroma.*—These tumors, which are at the same time the most interesting and the most frequent form of primary vesical neoplasm, are developed from the most superficial or papillary layer of the mucous membrane. They are characterized by the presence of numerous more or less slender, club-shaped, or hair-like processes, each of which consists of one or more capillary loops enveloped in a delicate fibrous stroma and an outer covering of polygonal epithelial cells. These villi may be simple or dendritic, and vary in length up to an inch or more. They are sometimes quite evenly distributed over a considerable portion of the bladder, but more often float out from the surface of one or more small sessile or polypoid fibrous growths. Papillomata are usually small, but may reach the size of an English walnut. They have an especial predilection for the neighborhood of the vesical orifices, bleed readily on being touched, and simple villi or tufts of villi are apt to become separated from the mass of the growth and escape with the urine. They rarely occur before puberty, and are most frequent in those who have passed the climacteric. Occasionally a development of villi takes place upon a cancerous base.

4. *Sarcoma.*—Only four cases of primary sarcoma of the female bladder have been reported. One of these tumors (case of Schlegten-dal<sup>1</sup>) was the size of a closed fist, white, bosselated, dense, with a smooth surface, and attached to the trigone. Voegtlein found nearly half the bladder infiltrated with a sarcomatous growth not exceeding 1 cm. in thickness at any one point. In Senfleben's case the growth was very soft, and tore so easily as to make traction with the forceps impossible.

5. *Carcinoma.*—While the bladder is frequently involved in cases of cancer of the vagina or uterus, primary cancer of the bladder itself is so rare that its existence even has been denied by as high an authority as Klebs. It seems, however, to have been met with in a few rare instances. Whether primary or secondary, it may be in the form of separate nodules, or it may infiltrate the vesical wall to a greater or less extent, or it may develop in the base, and later in the villi, of a pre-existing papilloma: in this way a benign villous tumor may become

<sup>1</sup> *Centraltb. f. Gyn.*, 1885, 24 (4 S.) p. 52.

converted into villous cancer or papillary carcinoma, whose malignant character at an early stage is apparent only on microscopical examination. All forms of vesical cancer tend to become necrotic, and may so disappear that the resulting ulceration presents microscopically almost nothing suggestive of a cancerous origin, except perhaps a narrow margin of induration. The bladder is usually found adherent to the adjacent organs as a result of secondary pericystitis, or there may be a general peritonitis. Metastases and affections of the lymph-glands are exceedingly rare with vesical cancer.

6. *Vesical cysts* have been here and there described, but it is probable that most of these cases have had an origin external to the bladder, into which they have advanced by perforation (dermoids, hydatids). The possibility of a simple retention-cyst of the bladder is not to be denied, but no cases have been met with in the literature of vesical tumors.

SYMPTOMOLOGY.—Vesical irritation, with frequent, painful and sometimes difficult micturition, is a symptom common to all vesical tumors so situated as to press upon the vesical neck or obstruct the passage of urine. Sometimes there is absolute retention, in other cases incontinence, when a pedunculated growth has forced its way into the vesical orifice: this may proceed even to a spontaneous elimination of the tumor, as Brenecke<sup>1</sup> observed in a case where a polypus of considerable size was driven through the urethra and completely expelled after a series of vesical contractions which recurred regularly every five minutes for a number of hours. Except at micturition, pain is not a prominent feature of the benign vesical tumors; with the malignant forms it occurs in 75 per cent. of all cases as constant in and about the bladder and radiating into the back, loins, and thighs. Most vesical tumors give rise, sooner or later, to chronic vesical catarrh, which may have been preceded by long-continued irritation and hæmaturia or have developed suddenly without apparent cause.

By far the most characteristic symptom of vesical tumors is hæmaturia. Occurring now and then with other forms, with cancerous and villous growths it is rarely if ever absent. Occasionally late and not appearing until dysuria or cystitis has already called attention to the bladder, it is often, on the other hand, not only the first symptom of a benign villous growth, but it may be repeated at irregular intervals for years before other symptoms appear. The hemorrhage is sometimes very abundant; it is quite independent of exertion, and occurs often in the night, then ceasing, perhaps not to reappear for years. Meanwhile the health remains undisturbed and the urine retains its normal condition. This precocious hemorrhage of spontaneous origin is an especially valuable sign of vesical neoplasm. Eventually, however,

<sup>1</sup> *Centrab. f. Gyn.*, 1879, iii. S. 177.



hemorrhage becomes more frequent; the patient becomes excessively anæmic; and sooner or later all the painful symptoms of chronic cystitis are added to increase the general weakness and further depress the functional activity of the system. Finally, the patient becomes so reduced that even a hemorrhage of very moderate extent is sufficient to cause a fatal syncope, or death may occur from uræmia.

Such is the course of an ordinary papilloma when left to itself. With cancerous growths the progress of the disease is more rapid and inevitable. The patient soon becomes cachectic; the urine is foul as a result of ulceration within the bladder; hemorrhage is frequent and excessive; and the patient finally dies of exhaustion or perforative peritonitis. The average duration of the disease is about a year.

Vesical tumors are seldom large enough to be felt by bimanual examination: sometimes a thickening of the vesico-vaginal septum may be perceptible. The sound should be used with great care, since it almost invariably provokes considerable hemorrhage, and in several cases this has proved immediately fatal. In the presence of a solid tumor the sound may be deviated to the right or left, or perhaps cannot be passed beyond the vesical orifice of the urethra. In cases of villous tumor certain operators have experienced a sensation as if the beak were entangled or moving in a mass of hair. As a rule, the sound will give negative results. If a catheter be used, villi will occasionally get caught in the eye of the instrument, and prove of great diagnostic value; hence the eye should always be inspected and any contents saved for microscopical examination. The urine also not infrequently contains portions of villous tumors, as small fleshy particles of much paler color than the numerous small blood-clots, for which they might be easily mistaken. The urine should be allowed to settle, the clear portion decanted, and the sediment spread out upon a large glass surface; any suspicious particles may thus be readily seen and reserved for the microscope. The urine may in other respects be quite normal, or it may, on the other hand, present all the characteristics of chronic cystitis.

DIAGNOSIS.—The symptoms described will most often arouse suspicion of vesical calculus, an affection which the use of the sound will at once render improbable. The endoscope may now and then enable us to see the neoplasm and acquire some knowledge as to its seat and extent. The certainty of the diagnosis when villous tufts are found in the urine or the eye of the catheter has already been spoken of. It is, however, desirable for operative purposes to know the size and extent of the growth, whether it is benign or malignant, and the nature of its attachment. These data are usually to be secured only by means of a digital exploration—a justifiable procedure whenever, in presence of a well-grounded suspicion or certainty of vesical neoplasm, it remains

doubtful whether its removal may not be effected through the urethra. It is needless to say that preparation to operate if necessary should be made previous to the dilatation, and if the growth be too large for removal through the urethra or of an infiltrating nature, so as to make an operation seem hazardous, the opportunity should be used to obtain a small portion of the growth by means of a curette or scissors. Except in those rare cases of primary cancer where some form of metastasis is discovered, the microscope alone will reveal the true character of the growth: a malignant sarcoma, for example, may present all the gross appearances of a simple mucous polyp.

PROGNOSIS.—Fibromata and mucous polypi are dangerous only in so far as they cause obstruction and perpetuate a chronic cystitis, which may eventuate in disease of the kidneys. Villous growths mean certain death if left to themselves. They may, indeed, exist for a long time, with only an occasional hemorrhage, and twenty-eight years have been known to elapse between the first appearance of hæmaturia and the onset of dangerous symptoms. But more often in three to four years the inevitable cystitis appears, the hemorrhages become frequent and excessive, and a high grade of anæmia is developed: death may then result, either from exhaustion or secondary nephritis. Operation, however, usually affords complete relief in all forms of benign vesical tumors without renal complication. Stein<sup>1</sup> has collected 45 cases of operated tumors in females whose age varied from nineteen months to seventy-five years; of these, 13 were fatal, 3 relieved, and 27 completely cured; of the fatal cases, 5 were malignant, and in all of the others there was either some form of renal disease or the growth was imperfectly removed; 4 of the fatal cases were children under five years of age, in whom, as a rule, the prognosis is decidedly less favorable. Villous growths are somewhat prone to recur if only partially excised.

With regard to malignant disease but little need be said. With sarcoma the prognosis is not so absolutely bad, since in two cases of removal there was at least no immediate recurrence. Cancer of the bladder is probably always fatal, usually in ten to twelve months, although in rare cases life may be prolonged for two or three years.

TREATMENT.—It is evident that any benign tumor should be removed as soon as discovered. Even with malignant growths life may be thus prolonged, since hemorrhage is much less abundant, and often ceases entirely, if only the surface of the growth is scraped away. There are three ways in which a vesical tumor may be made accessible: by dilatation of the urethra; by vaginal cystotomy; and by suprapubic cystotomy. Of the 45 operations previously referred to, 37 were urethral and 8 vaginal.

<sup>1</sup> *New York Med. Record*, 1885, xxviii. p. 281.

As a general rule, small pedunculated growths should be removed through the dilated urethra. The left index finger in the bladder, assisted, if necessary, by counter-pressure behind the pubes and the middle finger in the vagina, fixes the tumor so that it can be seized with a pair of Simon's forceps, which are inserted along the finger. The tumor may be twisted off, or possibly it may be encircled by an *écraseur*, which is passed in over the shank of the forceps. Diffuse sessile and soft growths may likewise be removed through the urethra by means of the finger-nail or curette, both of which are of great value in certain cases: the spoon of the curette should be at nearly right angles to the shank. Sometimes a tumor, together with its vesical attachment, may be dragged down through the urethra and completely exposed at the meatus, so as to be accessible to knife or scissors.

When the tumor is large, or by reason of its situation upon the anterior vesical wall its base is inaccessible through the urethra, it must be removed by vaginal cystotomy. Kaltenbach, indeed, deems this method imperative in all cases of non-polypoid growths where careful extirpation of the base of the tumor is necessary; and this opinion is also supported by the experience of the author. Norton removed successfully a sessile tumor from the trigone by dissecting up the vaginal mucous membrane, and then excising the whole portion of the vesical wall occupied by the growth. Usually Simon's T-incision will be the best (see page 459), through which the neoplasm, together with its vesical attachment, can be completely inverted into the vagina. Schlegten-dal<sup>1</sup> removed in this way a sarcoma as large as the closed fist, not hesitating to prolong the incision through the vesical sphincter, since the patient had long suffered from incontinence: the ends of a silk ligature, which had been passed around the pedicle by means of a curved needle previous to excision, were afterward carried out through the urethra, and the vaginal incision at once closed. The immediate result of this operation was perfect.

Suprapubic cystotomy has never been done in the female for a vesical neoplasm. It would be the only available operation in case of a large tumor occurring in a child. Still, even in children vaginal cystotomy is not at all impossible, since the vagina may be artificially dilated to a considerable degree, and calculi have been often removed in this way.

In general, it may be said that there is no unvarying rule of conduct applicable to the operative treatment of vesical tumors, but that the method of procedure must be adapted to each individual case. Senf-leben removed a large tumor through the urethra, with fatal result from instrumental perforation; perhaps this could have been avoided by the vaginal method, which has the great superiority of enabling the opera-

<sup>1</sup> *Loc. cit.*

tor to see as well as feel. Stroinski<sup>1</sup> also had a vesical rupture follow an attempt to twist off through the urethra a tumor with a very strong attachment; he saved his patient, however, by the unique procedure of inverting the whole bladder through the urethra and sewing up the rent with catgut sutures, after which reposition was easily effected and the patient made a perfect recovery. While these cases illustrate the danger of manipulation through the urethra, it may be mentioned, on the other hand, that Simon<sup>2</sup> successfully searped out through the urethra a tumor which occupied fully two-thirds of the whole vesical cavity.

Uncontrollable or even troublesome hemorrhage rarely attends the removal of a vesical tumor. When much hemorrhage occurs, it is to be controlled if possible by vesical injections of hot or cold water or of a solution of perchloride of iron (3 per cent.), or by a snug vaginal tampon and ice to the hypogastrium; ice may also be inserted into the vagina with very good results. In some cases perchloride of iron may be applied directly to the bleeding surface by means of brush and speculum. The same means are to be used in all cases of recurring hemorrhage from malignant or other vesical tumors which do not admit of thorough extirpation. In addition, the fluid extract of ergot should be given internally in teaspoonful doses, or ℥ x of dilute sulphuric acid may be combined with gr. x of gallic acid, and this mixture given every few hours. Opium is also an extremely valuable remedy. In case of recent hemorrhage the patient must also be kept perfectly quiet in the recumbent posture, with the pelvis slightly elevated; the diet must be restricted to milk and acidulated drinks, and constipation avoided by the use of mild enemata. The patient should refrain, if possible, from completely emptying the bladder, since it is at the end of micturition that hemorrhage is most likely to recur. When large clots of blood have collected in the bladder, they must be removed either by means of a large catheter, such as Ultzman has devised for this purpose, and a syringe, or, if this fails, by dilatation of the urethra.

#### § 4. FOREIGN BODIES IN THE BLADDER.

These may be conveniently divided into two classes, the first including all foreign bodies and substances which enter the bladder from without, and the second those which develop within the bladder itself—*i. e.* vesical calculi.

##### 1. FOREIGN BODIES FROM WITHOUT.

These may enter the bladder through a perforation of its wall or through the vesical orifices. Through a traumatic perforation splinters

<sup>1</sup> *Chic. Med. Journ.*, 1882, xlv. 478.

<sup>2</sup> Wiedt: *Arch. f. klin. Chirurgie*, 1875, xviii. 177.



of wood or bone, bullets, any sharp body upon which the patient has fallen, such as a lead-pencil, may enter the vesical cavity. An ulcerative perforation may connect the interior of the bladder with the small or large intestine, with an ovarian, dermoid, or echinococcal cyst, with an extra-uterine foetal sac, or any suppurating cavity of the abdomen or pelvis. Thus entrance is occasionally given to fecal matter and gases, gall-stones, portions of undigested food, lumbricoids, oxyuris, and other intestinal parasites. Cases are reported where hair, bones, and teeth from dermoid cysts, or even the bones of an extra-uterine foetus, have been emptied through a perforation into the bladder, and afterward voided, one by one, through the urethra. Daughter-cysts from a hydatid tumor have been passed in large numbers with the urine, having usually entered the bladder by perforation, but occasionally (case of Ainsworth) without discoverable tumor or fistulous opening. From the vagina, too, pessaries and other foreign bodies may ulcerate through into the bladder. Finally, a case has recently occurred where a portion of omentum was found post-mortem in the bladder, the hernia having taken place through an old perforation which had been freshly opened during an operative procedure.

More commonly, foreign bodies enter the bladder through one of the vesical orifices. Through the ureters come renal concretions in the form of gravel or small renal calculi, bits of renal tissue in cases of pyonephrosis, rarely the renal parasites *Filaria sanguinis* and *Distoma hæmatoform*.

But the variety of objects which have at various times been inserted through the urethra, both by accident and design, is so great as to be almost innumerable. Now and then a catheter or other instrument is broken off within the bladder or is drawn in by negative abdominal pressure. Pessaries have been inserted into the bladder by mistake through an abnormally dilated urethra. Straws, pipe-stems, goose-quills, and the like are sometimes used by patients for purposes of catheterization and allowed to escape from the fingers into the bladder. More commonly, foreign bodies are intentionally introduced by hysterical women or in an attempt at masturbation; probably a large proportion of all cases occur in this way. The favorite article seems to be a hair-pin, but pins of every description, needles and needle-cases, nail- and tooth-brushes, pieces of wire, toothpicks, and so on *ad infinitum*, have been used for this purpose. Occasionally this has occurred in an attempt on the part of the patient to produce an abortion.

All foreign bodies which are not perfectly smooth and unirritating soon give rise to cystitis, and in an alkaline urine the body soon becomes encrusted with phosphates. In case of a hair-pin or other pointed object the sharp end is usually found imbedded in the vesical wall, and the free end alone is encrusted. The phos-

phatic deposit may take place very soon after the body has been introduced; in the short space of two weeks the incrustation may reach very considerable proportions. Foreign bodies often form nuclei for stones.

**SYMPTOMS.**—Small bodies, such as hydatid cysts, gravel, feces, portions of blood-clots, and tufts of hair, may escape through the urethra soon after entrance, with more or less pain according to the nature of the substance. Intestinal gases are sometimes expelled with considerable noise, such as occurs at the anus, and the pain attending their escape is often quite considerable. Larger bodies which have a smooth surface may remain in the bladder for an indefinite time without causing inconvenience, but usually the presence of the intruder is at once followed by vesical irritation, with frequent micturition and tenesmus, and the urine soon indicates the development of cystitis.

**DIAGNOSIS.**—In cases of vesical perforation the previous history of intestinal ulceration or of pelvic abscess or cyst will suggest the possibility of this lesion. Examination of the urine will then in most cases disclose muscular fibres, vegetable cells, or fecal matter from the intestine, or it may reveal large quantities of pus in case of a pelvic abscess or suppurating cyst. A simple fecal odor of the urine is not diagnostic of intestinal perforation, since this odor is met with in certain cases of parenchymatous cystitis where the vesical walls become so altered as to permit a sort of gaseous transudation from the intestine. The presence of any large foreign body, such as may have been introduced through the urethra, is usually to be recognized by vaginal touch, and more especially by the sound. As a general rule, no reliance can be placed upon any negative history given by the patient, since all knowledge of any such occurrence is usually denied. In some cases the diagnosis can only be made by a digital exploration.

The **PROGNOSIS** must be guarded until the exact nature of the foreign body, its source and complications, are ascertained. A vesico-intestinal fistula is a serious lesion, although closure may in some cases be effected; if it remains open, cystitis will also persist, and eventually the kidneys will become diseased. The result of a fistulous tract connecting the bladder with a pelvic abscess or suppurating cyst must necessarily depend upon the progress of the latter. With a traumatic perforation, even when the peritoneum escapes, there is always great danger of urinary extravasation. A foreign body introduced through the urethra may usually be removed with safety, and recovery be complete; on the other hand, if interference is delayed, the result may be either an exhausting cystitis, abscess of the vesical wall, sloughing of the vesico-vaginal septum, or a gangrenous cystitis and fatal perforation.

TREATMENT.—Any foreign body in the bladder must be removed at once, and if a communication exists between the bladder and intestine or other source of invasion, it must, if possible, be induced to close. Removal may in some cases be effected through the dilated urethra; in others resort must be had to vaginal cystotomy. Since many foreign bodies enter through the urethra, most of them can be removed through the same channel, unless already too heavily incrustated. In the latter case it will often be necessary to first crush with a lithotrite before extraction, as described farther on under Vesical Calculi. In general, the most useful instrument for the extraction of a foreign body is an alligator or Simon's forceps. After dilatation of the urethra the finger is first introduced, and the body brought if possible into the most convenient position for extraction, which is, of course, with its long axis corresponding to that of the urethra: this may often be facilitated by partially filling the bladder with water. Hair-pins, pieces of wire, and the like frequently lie transversely with imbedded ends; in this event the central portion may sometimes be hooked down with the finger, so as to double the pin upon itself and at the same time free the ends; if it breaks, as often happens, the two halves will be left in a very favorable position for extraction. Barbed points imbedded in the base of the bladder may be pushed through into the vagina, and thence removed. Great care must be taken in any of these manipulations not to bruise the vesical or urethral wall, and if after full dilatation the body cannot be easily extracted without force, and crushing be considered impracticable, vaginal cystotomy should be done without further hesitation.

For the treatment of pelvic abscesses or suppurating cavities which discharge their contents into the bladder, the reader must be referred to other sections of this work. So long as the discharge continues the bladder must be washed out daily with an antiseptic solution. A fistulous communication with the intestine may, however, receive direct treatment at its vesical opening. This may be brought within the field of a urethral speculum and thoroughly canterized with the solid stick, or the latter may be successfully applied by the aid of the touch alone, as recently demonstrated in a case reported by Voegtlein.<sup>1</sup> In this patient the fistulous opening was found encircled by polypoid growths, and after canterization of the fistulous edges the discharge of feces and gas through the urethra soon began to diminish, and eventually ceased. In case of failure through the urethra the same treatment may be more effectually applied by partially inverting the bladder through a vesico-vaginal incision, or possibly, as Winekel suggests, the fistula may then be closed by sutures. Meanwhile, in either case, the diet should be restricted, the bowels kept in check by astringents or mild opiates, the

<sup>1</sup> *Correspondenzbl. d. Schwitzer Aerzte*, 1879, ix. 388.

recumbent posture maintained, and the bladder be kept clean by constant lavage.

## 2. VESICAL CALCULI.

Calculus is a rare affection in the female, occurring only in the proportion of one case to every twenty met with in the male. This fact is satisfactorily explained by the shortness and dilatibility of the female urethra, small particles being thus furnished with a ready means of escape, instead of being retained in the bladder to form nuclei for stone. Again, of the calculi found in women the proportion of purely phosphatic stones is much greater than in men, and that of uric-acid calculi correspondingly less: most authors attribute this difference to the greater frequency in the male of the uric-acid and gouty diatheses. Oxalic and cystine calculi are very rare.

The origin, therefore, of vesical calculus in the female is usually to be sought in the presence of a foreign body in the bladder which has developed a cystitis and served as a nucleus for a phosphatic deposit. Many of these foreign bodies have already been enumerated. Teeth from a dermoid cyst, seeds of various fruits, fecal particles, and the like have been found in the centre of stones; so also pins, needles, buttons, and all sorts of small articles introduced from without by hysterical women. Other nuclei may be furnished by the bladder itself, most frequently as blood-clots, also clumps of epithelium and of pus-cells, bits of tumors or necrotic tissue, possibly colonies of bacteria. Any abraded or ulcerated surface is especially apt to become incrustated, and hence it is that calculi so frequently develop after the operation for vesico-vaginal fistula, the first deposit probably taking place upon a suture or a denuded surface. Emmet regards this operation as one of the most fertile sources of calculi in women, but thinks the latter may be avoided by greater care in the apposition of the denuded surfaces. In rare instances such calculi probably form previous to the closing of the fistula, and escape notice because of their retention in the upper portion of the contracted bladder: as soon as closure of the fistula enables the bladder to fill with urine the stone falls to the base, where it soon gives evidence of its presence.<sup>1</sup> The tendency to the formation of calculi with vesical tumors and in any diverticulum, hernia, or similar malposition of the bladder, has already been noticed; hence the occasional occurrence of stone in a saccular dilatation or the vesical pouch formed behind the neck of the retroverted uterus or in a cystocele.

The vesical walls in cases of stone are more or less hypertrophied and, as a rule, inflamed. The stone may in rare cases be completely encapsulated, either in a sacculus or at the mouth of a ureter, or from having

<sup>1</sup> Campbell: *Am. Gynec. Trans.*, 1876.



wandered from the latter situation between the layers of the vesical wall. The urethra may be found somewhat dilated as a result of spontaneous efforts of the bladder to expel the stone.

Calculus may occur at any age, but is by far more frequent in children than in adults,<sup>1</sup> and in some cases it is congenital. As many as one hundred and eighty stones have been found in a single bladder; usually, however, only one stone is present.

**SYMPTOMS.**—A perfectly smooth stone may cause no symptoms whatever, or at most occasional sudden cessation of the stream at micturition before the act is completed. This symptom is, however, by no means as constant in cases of calculus as is usually supposed; it often disappears entirely with the growth of the stone and its consequent inability to enter the vesical neck. Most stones have a more or less irregular surface, and give rise to vesical irritation, and eventually to catarrh. Micturition is then frequent, painful, and often difficult. Constant pain in the vesical region or shooting into the loins, thighs, and joints is frequently complained of. Hæmaturia is seldom wholly lacking, and it is markedly characteristic of calculus that these two symptoms, pain and hemorrhage, are usually exaggerated after physical exertion or by any jarring motion, such as riding over a rough road. Hemorrhage is also especially liable to occur at the end of micturition, when the bladder contracts upon the rough stone. In the recumbent posture, when the stone falls away somewhat from the irritable vesical neck, and is no longer jolted about by movements of the body, all the symptoms are greatly alleviated. Children with vesical calculus are apt to suffer from a constant irritation of the external genitals; hence the clitoris is often found greatly enlarged in consequence of frequent rubbing, or the habit of masturbation may have been thus induced. Another not infrequent result in children of the vesical tenesmus caused by stone is prolapse of the rectum, and more rarely of the urethra. Still another symptom in children is incontinence, especially the nocturnal variety.

A vesical calculus by prolapsing in front of the advancing head may prove a serious complication of labor. Of 29 cases of calculus in pregnant women collected by Winckel, 5 were relieved of the stone by operation previous to the onset of labor; 7 were spontaneously delivered, but with resulting lesions of more or less gravity (vesico-vaginal fistula and incontinence); in 8 obstetric operations were necessary to effect delivery (manual extraction, forceps, perforation); in 7 cases the stone was removed during the progress of labor; one stone caused abortion, and was afterward spontaneously expelled; while in only 1 case was the attempt to replace the calculus during labor successful.

Numerous cases have been reported where calculi were spontaneously

<sup>1</sup> Hybord: *Des Calculs de la Vessie chez la Femme et les Petites filles*, Paris, 1872; Wresham: *Barth. Hosp. Rep.*, 1875, p. 127.

expelled from the bladder. This occasionally occurs through the vesico-vaginal septum in consequence of suppurative inflammation and the formation of a fistula. Much more commonly expulsion is effected through the urethra, and the passage of a stone whose smallest diameter was 3–4 cm. has happened repeatedly. Bryant has seen a stone measuring even 20 by 14 cm. in circumference expelled through the urethra without resulting incontinence, although so fortunate a termination is by no means to be anticipated in the majority of cases.

The **DIAGNOSIS** of calculus is in most cases easily made by means of the sound: the characteristic elick produced by gently knocking the beak of the instrument against the stone is quite unmistakable. A grating sensation alone is not so reliable, since this may proceed from a simple phosphatic deposit upon the vesical wall. Vaginal—or, in children, rectal—touch will also in most cases reveal the presence of a hard body in the bladder, and if the latter is full the sensation of ballottement may be obtained. By means of bimanual palpation the stone may often be grasped between the fingers and its size roughly estimated. The possibility that the stone may be encapsulated must be borne in mind—a condition to be suspected if the stone does not appear to change its position or the elick of the sound is always elicited in exactly the same locality: in case of any doubt as to diagnosis digital exploration should be made through the dilated urethra.

Conditions for which calculus has been mistaken are—pelvic exostoses, fibroids of the anterior uterine wall, and even the body of an anteverted uterus. Especially when complicating labor the stone, if jammed down in advance of the head, may have every appearance of a hard, immovable tumor growing from the symphysis pubis. It seems hardly necessary to do more than mention these possible sources of error, and to again emphasize the necessity of using the sound whenever there is any possibility of calculus.

Now and then neuralgic pain is the especial symptom of calculus to which the greatest prominence is given by the patient, while the urinary symptoms are perhaps deemed scarcely worthy of mention. Here, again, the habit of a routine examination of all the pelvic organs is the only safeguard against blunders in diagnosis.

**PROGNOSIS.**—The operation for stone is much easier and safer in women than in men, on account of the shortness and dilatability of the urethra and the accessibility of the bladder through the vagina. The prognosis, therefore, in adults depends chiefly upon the complications. We have already seen that these may be grave: there may be vesico-vaginal fistula with serious loss of tissue, incurable incontinence from dilatation of the vesical sphincter, or a chronic cystitis with ulceration and fatal degeneration of the kidneys. Complicating pregnancy, a stone may produce abortion or necessitate a serious operation during

labor. While, therefore, most women with calculus can be radically cured, and a moderate cystitis rapidly vanishes after removal of the stone, the prognosis must, as a rule, be somewhat guarded. This is still more applicable to children, in whom the smallness of the parts sometimes makes it necessary to resort to hypogastric cystotomy—an operation which is always attended with great danger. Of 56 cases of calculus operation in girls under the age of fifteen collected by Wresham,<sup>1</sup> hypogastric cystotomy was necessary in 4, and of these 2 recovered; of the remaining 52, 1 was fatal, 7 were followed by permanent incontinence (all cases of lateral incision of the urethra), and 44 were completely successful.

**TREATMENT.**—This must vary according to the size and density of the stone, its complications, the age of the patient, and the previous experience of the surgeon. Of the various operations which have been at different times in vogue, the superiority of the following four has been abundantly proved:

Dilatation of the urethra;

Lithotripsy;

Vaginal cystotomy;

Hypogastric cystotomy.

(a) Dilatation of the urethra should never be carried beyond a diameter of 2 em. in adults, and 1.5 em. in children if incontinence is to be avoided. This operation is therefore suitable only for stones which do not exceed these limits, and for these it is undoubtedly the best. The patient must be etherized, placed in the dorsal position, and after free dilatation the stone may be extracted with an alligator or Simon's forceps, provided this can be effected without the use of force, which must be carefully avoided in order that the urethra may escape injury. One or two fingers in the vagina—or, in children, in the rectum—may greatly assist the forceps in grasping the stone in its most favorable diameter. Ogston<sup>2</sup> advises dilatation and conjoined manipulation alone as a means of extraction, the stone being worked by the fingers into and along the urethra; the method should certainly be tried with small stones, as being the simplest and least likely to cause a urethral tear.

(b) The attempt should be made to crush any stone which cannot be easily drawn through the dilated urethra or which has otherwise proved to be large. For lithotripsy, dilatation need only be carried to the size of a Bigelow evacuating-tube; gm. 150 or 200 of water are then injected into the bladder, the stone crushed by means of an ordinary lithotrite, and the fragments washed out with a Bigelow evacuator, or, as advised by Heath,<sup>3</sup> with an ordinary hand-syringe through a urethral speculum. If the urethra has already been considerably dilated in the hope

<sup>1</sup> *Op. cit.*

<sup>2</sup> *Edin. Med. Journ.*, 1879–80, xxv. p. 26.

<sup>3</sup> *Lancet*, 1882, p. 1067.

of extraction with forceps, a simple Erichsen or Dolbeau crusher may often be used, such as is employed in the operation of lateral lithotomy in the male. Lithotripsy is especially valuable in children, in whom, owing to the narrowness of the parts, the vaginal operation presents certain difficulties.

(c) Extraction through a vesico-vaginal incision is rendered necessary under the following conditions: when the stone is large, and too hard to be readily crushed; when incontinence renders it impossible to keep the bladder sufficiently full of water for working the lithotrite; when the stone is encapsulated or lies in a sacculus or cystocoele or the opening of a ureter, so as to be inaccessible through the urethra; and, finally, when a severe cystitis makes a vesico-vaginal incision advisable also for purposes of drainage.

The operation need not, however, be necessarily restricted to so narrow a field. Any stone, hard or soft, may be properly removed in this way if the operator be experienced in dealing with vesico-vaginal fistulae. Lithotripsy has its drawbacks, and in the hands of a novice it is quite liable to result in serious injury to the bladder or urethra, either from the blades of the instrument or from sharp fragments of stone which escape crushing. Vaginal cystotomy, on the contrary, is a clean operation, devoid of danger, easy of execution, and objectionable only because of the resulting fistula. These two operations may therefore be fairly said to contest the field for all uncomplicated stones beyond a certain size, and choice will be made according to the previous experience and skill of the individual operator.

The operation itself of vaginal cystotomy does not differ from that already advised for certain cases of cystitis. A straight longitudinal incision will suffice in most cases, or it may be necessary to enlarge it by the transverse cut in front of the cervix uteri recommended by Simon. The opening must be large enough to admit of easy extraction; any bruising or laceration of the edges may cause sloughing and a resulting fistula which is difficult to heal. In those rare cases where the stone is more or less encapsulated it may be liberated by incision: Emmet<sup>1</sup> has met with three cases in which the stone lay in the mouth of a ureter; in one he was able to extract by the curette-forceps; in another an incision was made through the vagina directly upon the stone, which was thus removed without entering the vesical cavity. If necessary, a stone may be crushed through the vaginal incision by means of an Erichsen or Dolbeau forceps, after which evacuation will be easily effected by means of a stream which is forced in through the urethra.

Vaginal cystotomy is practicable in children as well as in adults: the hymen should be incised, and the vagina may then be rapidly

<sup>1</sup> *Op. cit.*



dilated to a sufficient extent to permit the passage of a comparatively large stone. Seven of Wresham's cases were operated in this way with a uniformly good result.

The after-treatment must depend upon the state of the bladder. If there is a chronic cystitis, the cut may be left open and the same course pursued as in other cases of cystotomy for relief of this disease. If the bladder is healthy or if only a mild or recent catarrh exists, the opening should be closed at once with interrupted silver sutures. Since the cut is clean and there is no cicatricial tissue, perfect union may, as a rule, be confidently expected.

(d) Hypogastric cystotomy is of course never to be thought of except as a last resort in cases where the stone is too hard and too large to be removed in any other way—a condition hardly to be anticipated in other than very small children. (For a description of this operation the reader is referred to works on general surgery.)

## § 5. VESICAL NEUROSES.

Under this head are included all affections of the bladder in which a disorder principally of its nervous apparatus is to be presumed. This disturbance is usually motor, and will be considered under the two forms of cystospasmus, or exaggerated functional activity of the muscular system of the bladder, and its reverse, vesical paralysis. Sensory disturbances are by no means uncommon, but they usually accompany the various spasmodic affections, and it seems hardly necessary to make what would be a purely artificial separation between the two forms.

### 1. CYSTOSPASMUS, OR IRRITABLE BLADDER; NEURALGIA VESICÆ.

By cystospasmus is meant an exaggerated muscular activity of the bladder, of reflex origin. This may be confined to either the vesical detrusor or the sphincter, or both together may be involved, and in either case the spasm is usually attended with considerable pain. These various factors, spasm of the detrusor, spasm of the sphincter, and pain—either one of which may be in one case the most prominent, and in another scarcely noticeable—have usually a common etiology, and are more or less associated in each individual case. They are therefore commonly grouped together under the convenient name of “irritable bladder.” It is, however, to be constantly borne in mind that this term represents not a disease, but merely a growth of symptoms of which the common origin is always to be sought.

The class of women most prone to suffer from these affections is the hysterical and neurotic, also those of a weakly and scrofulous constitu-

tion. In the great majority of cases the condition is secondary to other local or constitutional affections, but occasionally it is apparently idiopathic, and is brought on by exposure to cold, such as wetting the feet or sitting in a damp place or by sudden change in temperature from a hot into a cold atmosphere. It occurs also with emotional disturbances, such as fright, grief, anger, or any long-continued excitement. Excessive venery and onanism are not uncommon causes.

Among the numerous affections to which irritable bladder may be secondary, only those which are external to the bladder itself are here to be considered. Many of these have already been fully described as lesions of the urethra; for example, urethral stricture, dilatation, and tumors. Next in order come the affections of the other pelvic organs, and of these the uterus is probably most often at fault. Any malposition of this organ, or any enlargement, as from pregnancy, neoplasm, or metritis, which causes pressure upon the bladder or dragging upon the vesical neck, will probably cause irritable bladder: the same is true of cervicitis and cancer of the cervix. The vagina may furnish a source of vesical irritation in the shape of painful ulcerations, neoplasms, or foreign bodies. Various lesions of the rectum—ulcerations, fissure, stricture, hemorrhoids, prolapse, abnormal contents, such as oxyuris, ascarides, tænia, and fecal impaction—often give rise to reflex spasm of both vesical detrusor and sphincter. So also affections of the ovaries, such as neuralgia and the various forms of enlargement. Again, vesical irritation almost invariably attends parametritis, pelvic peritonitis, and hæmatocle (spasm, externally of the sphincter, is very apt to follow operative procedures in the pelvis, more especially in the vagina and upon the cervix uteri), often, it is true, as a result of direct extension of inflammation upon the vesical wall, but also indirectly through nervous channels. From the kidneys a direct irritant may be brought to the bladder in the form of pus, uric-acid concretions, a highly concentrated urine, or various ingested substances, such as asparagus, alcohol, and certain well-known drugs. Finally, irritable bladder occurs with many affections of the central nervous system: it is very common with hysteria and in spinal irritation, especially in that form occurring in young girls at puberty.

The most common form of irritable bladder is more or less frequent micturition, unattended with any great pain and caused by a reflex spasm of the vesical detrusor. Only a little urine collects before an urgent and irresistible desire to empty the bladder is again felt. This may be easily accomplished in most cases, while in others the sphincter, as well as the detrusor, is involved in the spasm, and the bladder is emptied with more or less difficulty. If the spasm is only moderate, the stream may flow in full force after a little straining on the part of the patient. In worse cases there is, in addition, a succession of pain-

ful clonic spasms of the sphincter, which render the stream jerky and irregular, and continue for some time after the bladder is emptied—a symptom commonly known as tenesmus. Spasm of the sphincter is not, however, necessarily associated with spasm of the detrusor, but may occur as a quite independent affection. Sometimes this is of mental origin, as when the sphincter refuses to open in the presence of another person; more often it is reflex, caused, among the other diseases mentioned, most often by vaginismus and painful affections of the rectum. In such cases catheterization may be very difficult and painful; even over-distension of the bladder may be a direct result of the spasm.

Cases are also met with in which neuralgia is the most prominent symptom, occurring as a constant severe pain in the bladder which radiates into the surrounding parts, and is usually attended with more or less tenesmus and frequency of micturition. These cases are often of malarial origin and in the form of paroxysms which recur at regular intervals.<sup>1</sup>

The urine from an irritable bladder may be quite normal, or it may present certain features of very common occurrence in hysterical and neurotic individuals. Polyuria is one of the most frequent anomalies; more rarely there is oliguria. In other cases the amount of phosphates is increased, and the urine is passed slightly alkaline or cloudy, without there being any inflammatory condition of the urinary passages or previous ingestion of alkalies. On heating such a urine there is a precipitate of earthy phosphates, which may be again dissolved by the addition of a few drops of acetic acid—a test of some value in the diagnosis of a neurosis.<sup>2</sup> A slight degree of glycosuria is occasionally met with, also an excess of urates or crystals of calcic oxalate. In some cases the amount of indican is largely increased.

The DIAGNOSIS of irritable bladder can only be made after a careful examination of the urine, and of the vesical interior by means of sound and endoscope, has excluded all other affections of the bladder itself. The sound will, however, often disclose considerable hyperæsthesia of the vesical wall, and it may encounter great resistance from a spasmodic condition of the vesical sphincter. The diagnosis is incomplete until the source of reflex disturbance has been found, for upon the latter must depend both prognosis and any successful line of treatment.

TREATMENT.—No one should be content with simple medication of the urinary passages unless satisfied that the attack is of idiopathic nature; and the time and care necessary to ferret out the source of irritation in each individual case render this affection one of the most difficult to treat successfully. For the immediate relief of painful spasm

<sup>1</sup> Gross: *The Urinary Organs*, 1851.

<sup>2</sup> Ultzman: *Neurosen d. Harnwege*, Wien. Klinik, 1879, v. 119-164.

opiates will often be necessary, or trial may be made of chloral hydrate or bromide of potassium: the chloral may be given in doses of gm. 1.25-2, in a small enema of starch-water. Other internal remedies which often give relief are tincture of gelsemium in doses of gm. .60 every six hours, and tincture of belladonna, gm. .06 every hour. Sitz-baths, hot douches, and heat to the hypogastrium are especially valuable in allaying all forms of vesical irritation. When the paroxysms are periodical, quinine should be tried, and in case of irritating urinary ingredients the diet must be restricted and diluent drinks be largely used. When there is persistent spasm of the sphincter which other means fail to relieve, dilatation of the urethra may be performed with a very good prospect of at least temporary improvement. The general condition must never be overlooked in the treatment of irritable bladder; and here, again, as in most vesical neuroses, signal results often follow the use of general galvanism. Once more, however, attention is drawn to the fact that it is only by discovery and removal of the cause of irritation that success is to be obtained in the treatment of most cases of this affection.

## 2. PARALYSIS VESICÆ.

Paralysis, as well as spasm, may affect either the detrusor or sphincter muscle. By the term "paralysis of the bladder," however, there is usually understood to be chiefly a paralysis or paresis of the detrusor, in consequence of which there is partial or complete retention of urine. Paralysis of the sphincter, on the other hand, results in incontinence, of which a peculiar variety, occurring chiefly in children, is called enuresis.

(a) *Paralysis of the Bladder.*—**ETIOLOGY.**—A certain amount of vesical atony or paresis usually accompanies advanced age, and corresponds to the various other forms of senile atrophy; such a condition may be greatly exaggerated by habitual over-distension of the bladder. In the young and middle-aged partial or complete retention of urine is the usual cause of vesical paralysis, the vesical walls becoming so thinned and stretched that the power of contraction is temporarily or permanently lost. In some cases the habit of retaining the urine for long periods is acquired. Not infrequently, young girls, on account of modesty or lack of convenient opportunity, refrain from emptying the bladder for long periods, with consequent over-distension and temporary paralysis. Strong mental emotion may for the time being so blunt the sensibility of the bladder that the desire to empty it is not felt, and the urine is allowed to accumulate. Hysterical women often retain their urine for long intervals, even when there is no spasm of the vesical sphincter.



The most common cause of retention is some mechanical obstruction which prevents the complete emptying of the bladder. Most of the causes of such obstruction have been frequently referred to in the section on Cystitis and elsewhere, such as a retroversion, especially of the gravid uterus; dislocations of the bladder, such as attend pregnancy and the puerperium; organic stricture of the urethra; spasm of the vesical neck, such as often follows operations about the vagina, pelvic tumors; and the like. The retention which often follows delivery is worthy of special emphasis, and three distinct forms are to be noted: first, that which may appear in the first few hours after labor from doubling of the urethra upon itself in consequence of the sinking of the emptied uterus; second, retention from obstructive œdema of the urethra, which often comes on twenty-four hours after delivery in connection with the swelling of the whole parturient canal; and, lastly, retention in the course of the second week after delivery from a puerperal pelvic cellulitis and resulting œdema of the vesical walls. With certain constitutional diseases, such as septic conditions, typhoid and other infectious diseases attended with a fatty degeneration of the tissues, the vesical wall may likewise suffer and lose its contractility. Kussmaul<sup>1</sup> has observed vesical paralysis in certain cases of lumbosacral neuritis which is propagated from inflammatory conditions of the kidneys. The frequent occurrence of vesical paralysis with cerebrospinal affections and all forms of coma is well known.

**SYMPTOMS.**—With partial retention and paresis the patient may make no complaint except that there is no sense of relief after micturition. Not infrequently a normal quantity of urine is passed at regular intervals, and yet the bladder is found abnormally distended. More often micturition is frequent because of the constant sensation of a full bladder, and from the catarrh which develops sooner or later in most cases of retention. The stream of urine has but little force, or it may simply dribble from the meatus, micturition being accomplished only by dint of great straining on the part of the abdominal muscles. In the worst cases there is complete incontinence—a condition called *ischuria paradoxa* on account of the constant dribbling of urine in connection with a distended bladder. This occurs in the later stages of chronic vesical paralysis, also in severe cases of acute retention when the sphincter has become mechanically dilated by the weight of urine above, or is also paralytic. Eventually, the retention of urine, and consequent ammoniacal fermentation, result in chronic cystitis and secondary degeneration of the kidneys. In rare cases rupture of the bladder may take place, especially if there be ulceration or a favoring fall or blow upon the abdomen.

In case of great distension, palpation and percussion of the hypogas-

<sup>1</sup> *Würtzburger med. Zeitschrift*, 1863, iv. p. 56.

trium reveal a rounded pyriform tumor, usually but not always in the median line, and reaching in some cases above the umbilicus: this tumor represents of course the distended bladder. The catheter in cases of paralysis, even if passed immediately after micturition, will always withdraw a certain amount of residual urine, and the stream from the catheter will be very weak or fall perpendicularly from its mouth. In some cases the amount withdrawn is almost incredible, even when the patient feels quite certain that she has recently emptied the bladder: instances are quite numerous where under such circumstances a gallon or more of urine has been obtained.

The **DIAGNOSIS** of vesical paralysis, especially when the latter is incomplete or associated with paralysis of the sphincter, must depend upon a thorough knowledge of the conditions under which paralysis is liable to occur, and especially upon the recognition of retention. When the latter is sudden and complete, it will hardly escape notice, but those cases where micturition is frequent or where there is actual incontinence are extremely liable to be misinterpreted and catheterization neglected. The rule should be strictly observed to make a careful abdominal examination in every case of incontinence, and to use the catheter in every case of abdominal tumor which could possibly be a distended bladder. If there is simple retention without paralysis, the stream will flow with nearly or quite its full force, instead of simply falling from the mouth of the catheter; as soon as the obstruction is removed the patient will be able to empty the bladder herself, and the catheter, which should be again inserted immediately after micturition has been accomplished, will show that there is no residual urine. In cases of more chronic paralysis, with regular micturition or perhaps incontinence, suspicion will be aroused by the advanced age of the patient, complaint that great straining is necessary to empty the bladder, that no sense of relief follows the act, and that the stream has lost its natural force. Here, again, the catheter must be introduced immediately after micturition, and in the absence of cystocele, of painful spasm at the vesical neck when the instrument is passed, and of mechanical obstruction, a residuum of urine affords certain proof that the function of the detrusor is impaired.

The **PROGNOSIS** must evidently be greatly influenced by the cause and the complications. Chronic paralysis, such as occurs in advanced age or follows vesical hypertrophy or is secondary to disease of the nervous centres, can be at most only relieved. In recent cases which result from acute retention the prognosis is favorable if the cause itself can be removed.

**TREATMENT.**—The most important indication in all cases of retention and possible paralysis is obviously to empty the bladder, in order that it may be able to assume its former dimensions. The catheter

is not, however, to be too rashly used in all cases of retention, especially at the outset when the danger of injection is greatest. Even with all possible care, catheterization may be the means of bacterial invasion of the bladder, and consequent cystitis. It is therefore advisable in cases of acute retention to first endeavor to induce spontaneous evacuation by the removal of any obstruction, and by hot hip-baths and hot applications above the pubes. If this can be brought about and clear urine is passed, nature alone may effect a cure if the urine is not again allowed to accumulate.

In the great majority of cases the catheter must be used, and here the utmost caution is demanded. The genitals should first be carefully washed, and the catheter inserted *à decouvert*. A fresh glass tube should be employed, through which a stream of carbolized water is flowing at the moment of insertion.<sup>1</sup> Not more than 500 cc. of urine should be withdrawn at first, and the patient should be kept in bed for at least twenty-four hours after the catheterization. If in withdrawing this amount the bladder is completely emptied, 200–300 cc. of carbolized water should be immediately injected, and left in the bladder until the next catheterization unless voluntarily expelled by the patient: this precaution is necessary because of the exceedingly dangerous and sometimes fatal cystopyelitis which has not infrequently followed the complete emptying of a paralytic bladder by the catheter—a result attributed by Ultzman to the negative pressure in the bladder and kidneys, and termed by him a “hyperæmia ex vacuo.”<sup>2</sup> The cystopyelitis may be purulent, gangrenous, or hemorrhagic, and is often attended with the formation of abscesses in the kidneys.

In two or three hours after the first partial evacuation with the catheter the bladder should be completely emptied and washed out with a 1:300 carbolic solution. If the patient then is able to pass voluntarily a certain amount of urine, the paralysis is probably only temporary, and a daily catheterization and washing will be sufficient. In other cases the process must be repeated three times daily until the bladder has partially regained its tonicity. After each washing 100 cc. of the carbolized solution should be left in the bladder, in order to prevent the painful contact of the vesical walls with each other and as a general antiseptic precaution: as the case progresses this amount may be gradually diminished. This same course of treatment is to be pursued in chronic cases, and a complicating cystitis is to be managed in the usual way. In some cases the patient herself must be taught to use the catheter, which should then be of soft rubber and be kept scrupulously clean.

Electricity is a valuable means of treatment in certain cases, but its

<sup>1</sup> Vide “Treatment of Cystitis.”

<sup>2</sup> Ultzman: *Neurosen d. Harnwege*, Wiener Klinik, 1879, v. 119–164.

use should not be begun until catheterization and washing alone have been tried for at least several weeks. It is best to use both the galvanic and faradic batteries on alternate days. With the former one pole should be placed over the lumbar vertebrae and the other over the hypogastrium; with the faradic current, one pole should be attached to a vesical electrode which is carried into the bladder, and the other applied alternately to the lumbar cord, interior of the vagina, and hypogastrium. Alternate hot and cold douches to the lumbar region are also valuable.

The best remedies for internal use are strychnia in doses of gm. .001-.002, and ergot in doses of .10-.20 three times daily; the general health must receive attention and tonics used if necessary.

(b) *Incontinence of Urine, Paralysis of the Sphincter*, in adults, is so rarely a primary lesion, and the various forms which result from mechanical causes, advanced age, central nervous affections, and the like have been so frequently mentioned in the preceding pages, that it will be sufficient here to state one or two ways in which we may attempt to relieve this usually incurable affection. Now and then it is found in young women as an affection which has followed them from childhood, and under these circumstances there is more hope of cure. Besides tonics and other internal remedies, such as strychnia, ergot, and cantharides, the galvanic current is a valuable method of local treatment, and may be applied by means of a urethral electrode, which is carried just up to but not within the vesical sphincter. Ultzman advises catheterization every one, two, or three hours in some cases of paralysis of the sphincter, in order to relieve the muscle for a time from all strain. When the incontinence seems to be due merely to nervous exhaustion and debility, a generous diet, change of scene, sea-baths in certain cases, and cold douches to the lumbar region may have a beneficial result. Finally, Fritsch<sup>1</sup> has succeeded in curing several cases of incontinence by removing a small rectangular piece of the vaginal mucosa just over the vesical sphincter, and bringing together the longitudinal edges of the denuded surface by silver sutures: theoretically, a fold may be supposed to be thus doubled in at the vesical orifice which forms a sort of mechanical impediment to the escape of urine. Many cases of incontinence are absolutely incurable, and a urinal must be permanently worn.

(c) *Enuresis (nocturna, diurna, continua)*.—This term is applied to a form of paresis of the vesical sphincter which occurs chiefly in children, and is characterized by the involuntary escape of urine at certain intervals. It is usually nocturnal, and, although perhaps more frequent in nervous and weakly children, it is by no means uncommon in those who are otherwise healthy and robust. Girls are quite as subject

<sup>1</sup> *Frauenkrankheiten*, 1888.



to it as boys, and it generally disappears with adolescence, although it may exceptionally continue into adult life.

In regard to the pathology of this affection there is a great difference of opinion. The enuresis is variously referred by different authors to bad habit, spasm of the detrusor, hyperæsthesia of the vesical neck, and atony or paresis of the sphincter. While the occasional influence of each of these factors is not to be denied, it seems probable that in most cases there is primarily a more or less defective innervation of the vesical sphincter. With all children up to the age of two years this is the normal condition: micturition as well as defecation is an involuntary act, not because of any defect in the muscular development of the sphincter, or of any hyperæsthesia of the vesical membrane, but because the reflex mechanism which causes the sphincter to contract as the bladder becomes filled is imperfectly developed. Enuresis may be regarded as a simple persistence of the infantile condition, aggravated in many cases by a reflex vesical irritability. Hence vulvitis and vaginitis, rectal parasites, urethral tumors and fissure, pruritus ani et vulvæ, and a host of other conditions, such as have been described in the section on Irritable Bladder, are always to be looked for as possible exciting causes. In other cases enuresis is probably due in part to certain dreams, like the somewhat analogous seminal emissions of adults. Occasionally it is nothing more than a bad habit which the child might easily overcome.

**TREATMENT.**—These various etiological factors show how important it is to make a judicious selection of remedies in the treatment of the individual case; for if the bladder is already hyperæsthetic, strychnia or electricity, which are very serviceable in cases of pure paresis of the sphincter, are distinctly contraindicated. The first and most essential point is to find whether there is any cause of reflex irritation, and if possible to remove this cause. If this fails to give relief, or if, as often happens, no cause is found and the presence of hyperæsthesia remains doubtful, the internal treatment should be begun with sedative remedies, as if dealing with a case of purely irritable bladder. Belladonna is the drug most universally recommended, and it may be given at the outset in doses of gm. .30 of the tincture three times daily, and afterward gradually increased in amount until the physiological effect is produced: its use must in many cases be continued even for months before any marked benefit is obtained. The bromides and chloral hydrate are sometimes efficient: Winekel has had excellent results from doses of gm. 1–1.5 of the latter at night in girls of twelve to fifteen years. A small quantity of Dover's powder at night, repeated for a few days, may serve to break up the habit.

When there is no reason to suspect a condition of hyperæsthesia the vesical stimulants should be employed. Strychnia is perhaps the most

valuable of internal remedies, and must not be administered in too small doses; with careful watching we may begin with gm. .001 three times daily, and gradually increase this dose to gm. .002. Gross considers powdered cantharides an especially valuable remedy in doses of gm. .002 three times daily in combination with strychnia and perhaps a little opium. Last and most important comes electricity, which Ultzman calls the remedy *par excellence* for enuresis: it may be easily applied by means of a rectal electrode, such as the above-named author has devised for this purpose.

In addition to local and specific treatment, the general health must often be improved by the use of cod-liver oil and iron. Shower-baths, lumbar douches, and sea-bathing will often prove of benefit when well borne. The child should be made to eat a light supper, should be kept from all excitement in the evening, and be compelled, if possible, to sleep on the side rather than on the back. The urine should always be examined, since appropriate cases have been cured by the simple use of diluent drinks. In those exceptional cases where wilfulness on the part of the child seems to be the most probable cause, there is no better form of moral treatment than the topical subcutaneous injection of a syringeful of warm water.<sup>1</sup>

In the preparation of the foregoing section the author has to acknowledge the great assistance which he has received from Dr. Herbert B. Whitney, who has shown much patience and perseverance in looking up the literature of the subject as well as in the arrangement of the material.

<sup>1</sup> Henoch: *Kinderkrankheiten*.



# NON-MALIGNANT TUMORS OF THE UTERUS.

By R. STANSBURY SUTTON, A. M., M. D., LL.D.,

PITTSBURG.

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## FIBRO-MYOMATA OR FIBROID TUMORS.

SYNONYMS.—Fibro-myomata,<sup>1</sup> or fibroid tumors; myo-fibromata;<sup>2</sup> fibrous tumor;<sup>3</sup> tumeur fibreuse;<sup>4</sup> hysterome;<sup>5</sup> fibroma uteri;<sup>6</sup> myoma;<sup>7</sup> tubereulum;<sup>8</sup> cellulo-fibrous bodies;<sup>9</sup> steatoma, etc.<sup>10</sup>

DEFINITION.—The familiar terms fibroid tumor, fibro-cystic tumor, and fibroid polypi of the uterus every medical man recognizes as belonging to the same class of neoplasms. We all understand by the fibro-cystic tumor that a solid fibroid tumor has undergone a cystic degeneration. Notwithstanding our familiarity with these terms, they are objectionable, because they do not convey to the mind a comprehensive idea of the pathology of the neoplastic growths to which they are applied. The term fibroid (*fibrosus* and *eidos*) and the term fibrous mean fibre-like, and are only applicable to a tumor composed entirely of fibrous tissue. The fibrous or fibroid tumor found in various localities is always situated in connective tissue; it contains only occasionally a few yellow elastic fibres, is often quite vascular, has no distinct capsule, and must be dissected out.

But the so-called uterine fibroid contains a variable quantity of muscular tissue as well as of fibrous tissue, both of which are derived from the parenchyma of the uterus in which the tumor grows. By reason of the presence of muscular tissue Virchow proposed that these tumors be called myomata. This term designates only their muscular element, and is as objectionable as the term fibroid. The term myo-fibromata or fibro-myomata fully designates the solid tumor, and the prefix cystic that variety in which cystic degeneration has occurred.

<sup>1</sup> Virchow.

<sup>2</sup> Thomas.

<sup>3</sup> English writers.

<sup>4</sup> Amussat.

<sup>5</sup> French writers.

<sup>6</sup> Klob.

<sup>7</sup> Virchow.

<sup>8</sup> Morgagni.

<sup>9</sup> Bayle.

<sup>10</sup> Voigtel.



**ETIOLOGY.**—The etiology of these tumors is still a mystery. They are more frequent in the black than in the white race. In both races they are more frequent in the body than in the neck of the uterus, and more frequently situated in the posterior than in the anterior wall. Prior to puberty they present no positive symptoms of their existence. From a careful analysis of the case of a highly-intelligent lady under my care for many years I believe that the neoplasm does sometimes exist prior to puberty. After the menopause is established these tumors generally disappear unless they have undergone cystic degeneration. Bearing on this point I have at present an anomalous case. My patient is forty-three years of age. She has never menstruated in her life, has never shown any physiological evidence of ovulation, has been twice married, is now a widow, and is childless. She has had for ten years a large fibro-myoma of the uterus, which thus far shows no evidence of atrophy.

If prior to the establishment of the menopause the fibro-myoma has undergone cystic degeneration, it will continue to grow. The removal of the ovaries and Fallopian tubes in such cases by Mr. Lawson Tait and Dr. Bantock has proved insufficient to stop the growth of the cystic or very soft fibro-myoma. Months after removal of both ovaries and tubes I have seen Dr. Bantock compelled to make a supravaginal hysterectomy. Concerning the causes which produce these tumors nothing is known. By reason of their existence a woman may be sterile, but it is not yet proven that sterility favors their origin or growth.

**PATHOLOGY.**—The tumor always has its origin in the substance of the uterine wall or subperitoneal connective tissue. It begins as a hard nodule, involving in its further development both the muscular and fibrous tissues. Later it becomes invested with a thick layer of fibrous tissue, which, with the superimposed uterine tissue, constitutes its envelope or capsule. Within this capsule the blood-vessels ramify and form a network, sending prolongations to feed the enclosed growth, which now lies like a foreign body in or attached to the wall of the uterus. Rarely large blood-vessels penetrate the substance of the tumor. Such tumors have, however, been observed by Virchow, Leopold, and Schroeder, in which large blood-sinuses existed, the walls of the sinuses being composed of the muscular fibre of the uterus involved in the growth of the tumor. Klebs has proved the existence of lymphatics, and Lorey of nerves in this class of growths. The presence of lymphatics often determines the variety of future cystic degeneration. As the tumor enlarges it separates the tissues composing the uterine wall or compresses it as it pushes the peritoneum outward. The consequent irritation invites a greater blood-supply and hyperplasia of the walls begins. As the tumor excites more and more

irritation, and the muscular tissues of the uterus grow stronger, the neoplasm, if developing within the walls, may begin to advance either toward the peritoneal covering of the uterus or toward the endometrium. Should, however, its location favor, it may separate wider and wider the uterine tissues, keeping its relative position from either surface. Thus the tumor is finally fixed in the uterine walls, and is designated as interstitial or intramural (Fig. 153); or if it is developed or forced toward the peritoneum, carrying the latter with it as an

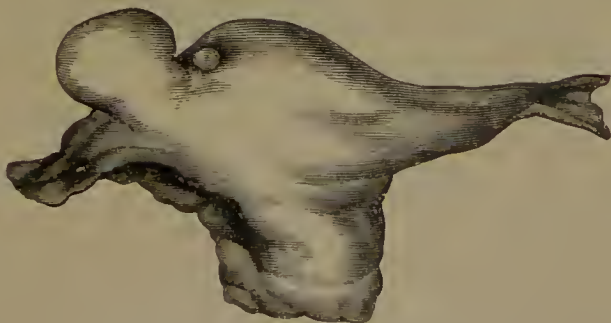
FIG. 153.



Interstitial Fibroid Tumor.

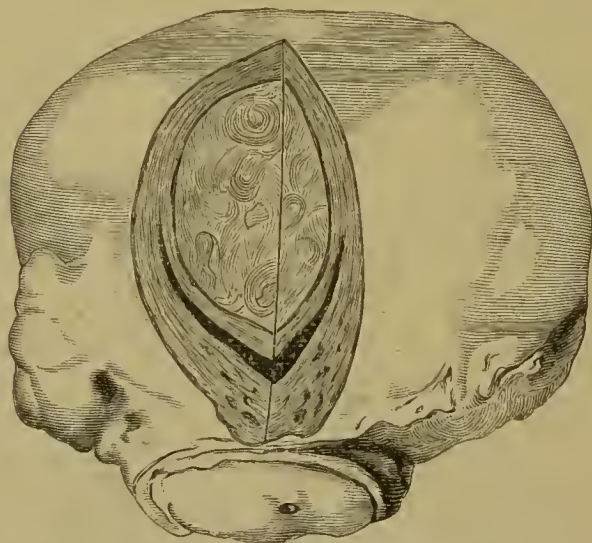
investment, it is then designated as subperitoneal (Fig. 154); or if it has advanced toward or been developed near the cavity of the uterus and rests beneath the endometrium, it is designated as submucous (Fig. 155).

FIG. 154.



Pediculated Subperitoneal Fibroid Tumor.

FIG. 155.



Submucous Fibroid Tumor, projecting into uterine cavity.

The tumor may consist of a single nodule or centre of formation, or it may consist of a number of nodules or centres of formation interlaced closely and invested by a common capsule (Fig. 156).

FIG. 156.



Section of a Large Fibroid Tumor, with the fibres arranged around several centres.

This fact suggested to Mr. Lawson Tait a new nomenclature for these growths—namely, uninodular and multinodular fibro-myomata.



As the tumor grows, either the fibrous tissue or the muscular tissue will preponderate. When the fibrous tissue is bountiful, the tumor will be hard, even as hard as cartilage; when the muscular tissue is most bountiful, the tumor will be softer, even sufficiently so as to merit the name fleshy tumor or myoma. A tumor largely composed of fibrous tissue will usually be of moderate size and of very slow growth, but the reverse is apt to occur in those tumors in which the muscular tissue preponderates; and these tumors are especially liable to cystic degeneration. On the other hand, the latter class, if cystic degeneration does not occur, are liable to rapid disappearance after the establishment of the menopause. Not infrequently several separate and distinct fibro-myomata are found in the same uterus. Thus I have seen eight small subperitoneal fibro-myomata attached to the surface of the uterus of an old negro woman who, prior to the post-mortem, gave no evidence of their existence. Thomas exhibited to the New York Pathological Society a uterus containing thirty-five tumors of various sizes, and Schroeder of Berlin cites a case by Schultz in which at least fifty tumors existed in the uterus. A remarkable feature of Schultz's case was that the woman was eighty-three years of age. The uterus was obtained post-mortem. In cases of multiple myomata the growths may be so distributed in the uterus as to present the subperitoneal, the intramural, submucous, and polypoid varieties.

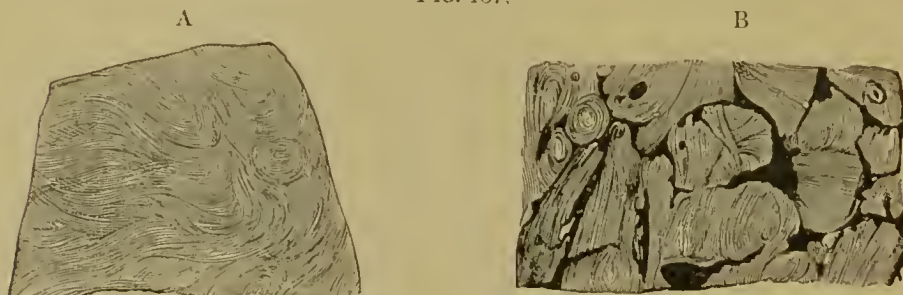
The changes occurring in the uterus itself are not constant. The muscular tissues hypertrophy to a greater or less extent in all cases, and, while hypertrophy is going on in one direction, atrophy of the muscular tissue on the side toward which the tumor is advancing may also be in progress. After the tumor has become subperitoneal the uterus may atrophy to a very marked degree—a condition not infrequent in old subjects. The cavity of the uterus is usually increased in depth, while in the submucous and intramural variety it may also be obstructed. The lining membrane of the uterus, by reason of the constant hyperæmia, is more vascular, bleeds more readily upon the introduction of the sound, than in cases of normal condition, while in cases of submucous fibro-myomata or polypoid fibro-myomata menstruation is almost always profuse, and between the regular periods blood is frequently lost or even constantly. In addition to this a serous discharge, intermingled with the vaginal and uterine secretion and having an unpleasant odor, is not always wanting. The uterus in no instance occupies its normal position, but is either pulled or pushed into an abnormal one, dependent on the size and position of the tumor. The cut section of fibro-myoma will vary in appearance according to the preponderance of its constituents. If the fibrous tissue be very abundant, the section will cut like cartilage, and have a gray color and satin-like glossy



appearance (Fig. 157, A). If the muscular tissue exists to a marked degree, the consistency of the section will be softer and the color will vary from pink to red.

The lymphatic spaces of Klebs are sometimes seen between the bundles of muscular tissue (Fig. 157, B). When but little muscular tissue

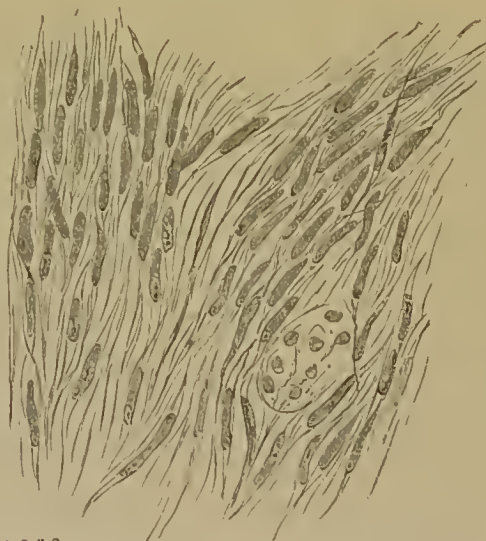
FIG. 157.



Sections of Fibroid Tumor: A, wavy bundles of fibrous tissue; B, spaces between bundles of fibrous tissue.

is present the section will be smooth, but if the reverse is the case the surface is uneven, as the contracting fibrous bands force the softer muscular tissue above the surface. At the margin of the section and surrounding it is found a layer of condensed fibrous muscular tissue forming the capsule. (See Fig. 156.) This is sometimes closely, at other

FIG. 158.



× 220

Structure of Fibroid Uterus, showing waving bands of long spindle cells, with rod-shaped nuclei of plain muscular tissue, the nuclei stained with carmine. At one point a few cells divided transversely (ad. nat., by H. Arnott).

times loosely, attached to the tumor. Frequently it is easy with the thumb-nail to detach it entirely, a process we shall yet learn to be that of "enucleation." On microscopic examination of the harder variety are

seen wavy bundles of fibrous tissue with a small amount of unstriped muscular tissue. (See Fig. 157.) The softer variety presents, in addition to the fibrous tissue, a greater amount of unstriped muscular fibres in twisted bundles, the muscular fibre being identical with the muscular fibre of the uterus. If the specimen be stained in carmine solution and washed in a solution of acetic acid, the rod-shaped nuclei of the spindle-shaped cells will be brought into view (Fig. 158). The important practical point in this is to establish a positive differential diagnosis between the fibro-myoma and sarcoma. The latter, when removed from the uterus, as elsewhere, is almost sure to return, and constitutes what has been erroneously called the recurrent fibroid tumor.

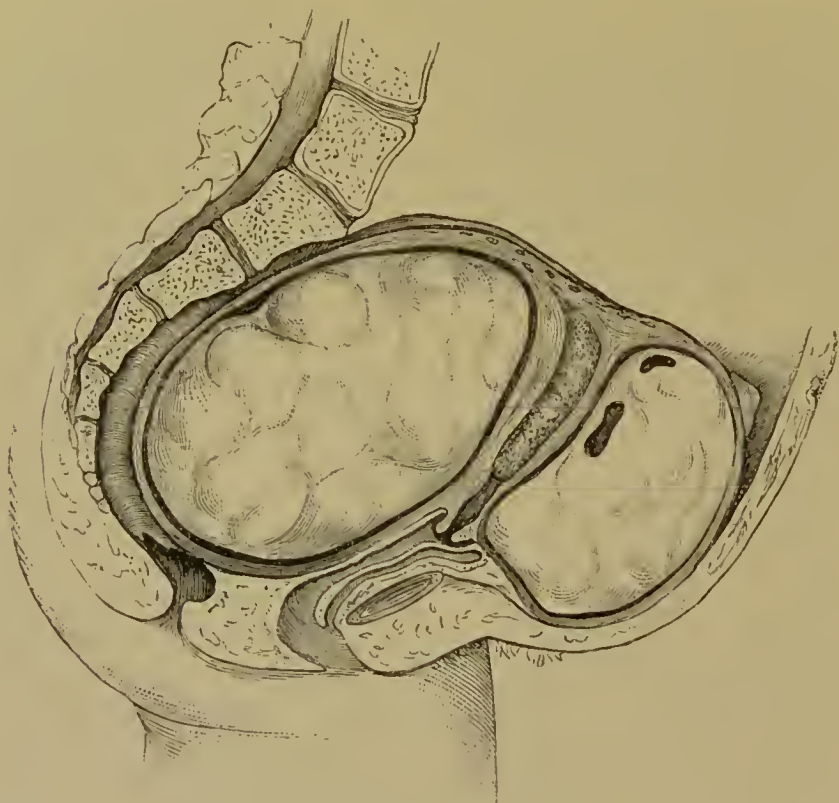
The nuclei of the spindle-shaped sarcoma-cells are round or oval; of the fibro-myomata, they are rod-shaped. The limit of growth for the hard myomata is difficult to determine. They have after removal been found to weigh fifty or sixty pounds. Until expelled from the walls of the uterus they maintain a globular form. After extrusion into the cavity of the peritoneum they are free from the pressure of the uterine muscular tissue, and generally lose the globular form. After extrusion into the cavity of the uterus they usually become pear-shaped—a fact probably due to the lateral pressure now exerted upon them in the expulsive efforts of the uterus. Their density varies with the amount of fibrous tissue in their composition, and is a determining element in the shape of their future growth, when they become subperitoneal. The globular form is not, however, infrequently retained in very solid tumors after they have become polypoid tumors, either upon the exterior or interior surface of the uterine walls (Fig. 159). The irregularity of surface occasionally seen is due often to the multinodular composition of the neoplasm, some nodules growing faster than others by reason of obtaining a better blood-supply. Another element in determining the shape of the subperitoneal tumor is the pressure against the walls of the pelvis; regularity of contour is more apt to exist when the tumor has become too large to enter the small pelvis. Occasionally, in addition to the mass in the pelvis, a prolongation of the tumor upward, cone-like, is felt through the abdominal wall. I have seen the tumor pear-shaped, the big end up, and the other end filling the pelvis completely.

Frequently the tumor, when subperitoneal, may be felt extending above Ponpart's ligament, dragging the uterus with it side by side, it being difficult or even impossible to decide, when the os is almost or entirely out of reach, which is tumor and which is uterus. The sound may determine. If the cervix can be seized with a volsellum forceps and the uterus be thus moved, while the free hand over the abdomen takes cognizance of the movements, it may also be determined.

The changes which occur in fibro-myomata are as follows—varieties of softening:

*Edema.*—At the time of the menstrual period I am sure I have seen them occasionally swollen or œdematous, this condition disappearing again a few days later. But this condition may continue to such a

FIG. 159.



Large Fibroid Tumors, one in the anterior, the other in the posterior, wall of the uterus.

degree that a spurious fluctuation may exist. Such tumors have been tapped for ovarian cysts, and a few drops of yellow, slimy mucus, escaping, told of the error of diagnosis, or the tapping has been dry. I have seen such tumors give apparently real and distinct fluctuation after being extirpated and laid on the table. A beautiful example of this I witnessed in the operating-room of Professor Küster of Berlin. The tumor when cut through was completely infiltrated; in the meshes of fibrous tissue hundreds of very small cysts existed, and the muscular tissues of the growth had wellnigh disappeared. Such tumors have been found by other operators. The œdema is sometimes intermittent, returning after entire subsidence.

*Fatty Degeneration.*—After the menopause, and occasionally after

pregnancy, complicated with intramural fibro-myoma, fatty degeneration occurs in the muscular element of the growth; this is absorbed and the fibrous tissue alone left. Some years ago I saw a lady with a large intramural fibro-myoma who afterward became pregnant, was delivered near full term, and in the process of uterine involution the tumor disappeared. In very old subjects the remains of prior fibromyomata are simply nodules of the concentrated fibrous tissue.

*Myxomatous Degeneration.*—Occasionally in the tissues comprising the growth there exists mucoid tissue which secretes mucus, and forms often cavities of considerable size; this condition of the tumor is known as myxomatous degeneration (Virchow).

*Suppuration.*—Should the blood-supply be entirely cut off from the growth, as in twisting of the pedicle in the subperitoneal variety or of the polypoid submucous variety, or if the capsule be widely detached in an effort at enucleation per vaginam, the tumor may die and soften. This change has been designated erroneously as suppuration. True inflammatory softening and suppuration of a fibro-myoma is rarely seen, but Dr. M. D. Mann<sup>1</sup> reports having seen a pus-cavity containing two quarts in the middle of a fibro-myoma.

*Gangrene.*<sup>2</sup>—The submucous variety is especially liable to necrosis and spontaneous expulsion. An inflammation of the capsule resulting in interference with the nutrition of the growth, or inducing an ulceration on the surface of the capsule, is the usual cause. The resistance of the capsule being impaired by the opening, the tumor is expelled by uterine contractions entire or piecemeal. This fact led to the treatment of this variety by means intended to open the capsule through the cavity of the uterus. Atlee and Brown gouged holes in the capsule or divided it with the knife. Greenhalgh attacked the capsule with the cauterizing-iron. Byford<sup>3</sup> induced rupture of the capsule with ergot. Cures have been obtained by all of these methods, none of which are free from danger. Gangrene of the subperitoneal variety has been observed. Cases of inflammation of the capsule, adhesion to and perforation of the abdominal wall, followed by the escape of the gangrenous neoplasm, have been reported by Soir,<sup>4</sup> Dumesnil, Gutierrez, Hofmohl, and Schmidt.

*Varieties of Induration.*—After fatty degeneration of the muscular elements their absorption follows, but the fibrous tissue is left behind and contracts to form a very hard but small tumor. When the tumor contains very little muscular tissue it is nearly as hard as cartilage.

*Calcification* (Fig. 160).—Chalky or phosphatic degeneration of these tumors has long been known. Hippocrates relates such a case, a Thessa-

<sup>1</sup> *Amer. Journ. of Obstet.*, vol. xx. p. 462.

<sup>2</sup> Byford, Barnes, Thomas, Winckel, Gusserow, and others.

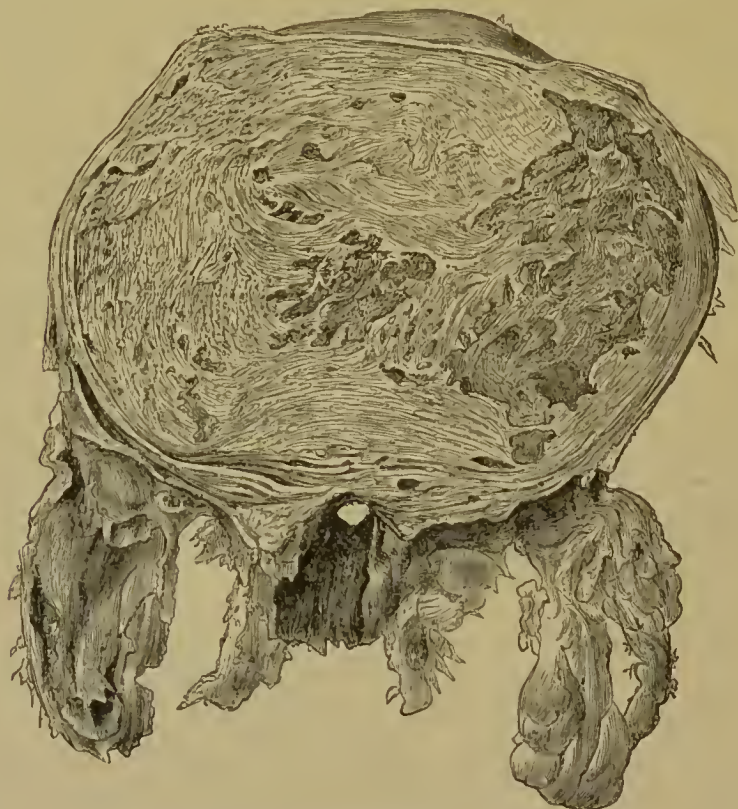
<sup>3</sup> *Amer. Gyn. Trans.*, vol. i., 1876.

<sup>4</sup> Winckel: *Diseases of Women*, by Parvin.



lian woman aged sixty years; and Salins the case of a nun who had such a tumor. Schroeder refers to such cases by Louis, Velpeau, Jaffé, and Saxinger. A few years ago I removed a subperitoneal fibro-myoma

FIG. 160.



Ossified or Cretified Fibroid Tumor of Uterus (half size).

which was larger than a goose-egg and nearly as hard as a stone. It was reached through the posterior vaginal wall. The cretaceous matter appears first, says Schroeder, in streaks through the interior of the tumor. It may finally become so dense as to produce a stone of sufficient solidity to require to be cut through with a saw. The small tumors, especially the subperitoneal and intramural, are most liable to this change. When the blood-vessels are cut off the nutrition ceases. The tumor is now a foreign body, and is apt to act as such. It may cause an inflammation of the adjoining tissues, and when these are softened it may escape into the peritoneal cavity, causing fatal peritonitis, or, escaping into the uterine cavity, be expelled, leaving the patient to recover. In my own case the cretaceous material was in lamellæ and formed a complete shelly layer over the surface. It was producing frequent attacks of peritonitis, for which reason I removed it. The patient was a negro woman. True suppuration

of a fibro-myoma must be rare, yet authors authenticate it after traumatic injury to the growths, and also in association with cretaceous degeneration. Beyond the changes already referred to, these tumors, by various processes of degeneration, become cystic, and occasionally are apparently attacked with that most malignant of diseases, sarcoma.

*Cystic Degeneration* (Fig. 161).—A solid fibro-myoma may become

FIG. 161.



Large Three-lobed Fibroid, springing from the fundus by a somewhat thin pedicle, of which CF is cystic, while SsF and the dark shaded mass behind the uterus are subserous.

cystic through fatty degeneration, mucous degeneration, suppuration, serous infiltration, the formation of lymph-cavities filling with a clear fluid coagulating on exposure to the air, or from breaking down of clots in large blood-cavities already existing in the tumor. In the multinodular tumors one or more of the nodules may break down, while others maintain their original solid condition, and a mixed tumor results. As already observed, these growths take largely to themselves the connective fibrous tissue of the uterus. Connective tissue is that in which alone we find sarcoma developing in the body. The fibro-myoma and sarcoma are first cousins as to origin, and when the sarcoma begins, with its spindle cell and oval or round nucleus, to invade the myoma, it finds the natural tissue of its selection to work upon. Myomata thus invaded grow softer, and may even undergo cystic degeneration, and give rise to a tumor properly designated sarcomatous cystic fibro-myoma.

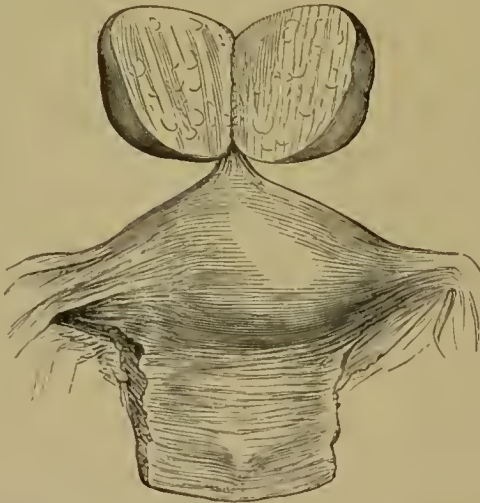
The termination of the cystic fibro-myoma is widely different from that of the simple fibro-myoma: while the latter occasionally destroys

the woman (especially the submucous variety), the former always tends to terminate fatally. Fibro-cystic tumors grow more slowly than ovarian cystomata, but by mechanical interference with respiration, circulation, and nutrition, and by producing nervous exhaustion, and also occasionally by causing a great loss of blood from the uterus, they tend with equal certainty to the destruction, sooner or later, of the life of the patient.

The location of simple fibro-myomata has everything to do with their importance; it is therefore excusable to make the arbitrary division of subperitoneal, interstitial or intramural, and submucous; also to consider each variety separately.

*Description.*—*Subperitoneal Fibro-myomata* (Fig. 162).—Virchow termed this variety the peritoneal polyp, and there is no difference of

FIG. 162.



Subperitoneal Fibroid Tumor of Uterus, pediculated.

structure between it and the fibro-myomatous polyp found in the uterine cavity. When the tumor is forced out of the uterine wall into the cavity of the peritoneum, it carries with it the peritoneum investing the uterus, except in those cases where it projects from the side of the uterus and is pressed out between the layers of the broad ligament, which subsequently forms a serous covering for it. The tumor may remain closely adherent to the wall of the uterus, or, gradually leaving, develop a pedicle which may after a time remain thick or become so attenuated as to consist of nothing but two layers of peritoneum, the intervening cellular tissue and blood-vessels, some lymphatics, and nerves. The tumor continues to grow in the cavity of the pelvis, toward which it gravitates, retroverting the uterus early only if attached to the posterior wall, until finally it reaches such a size that it cannot enter the superior strait of the pelvis.



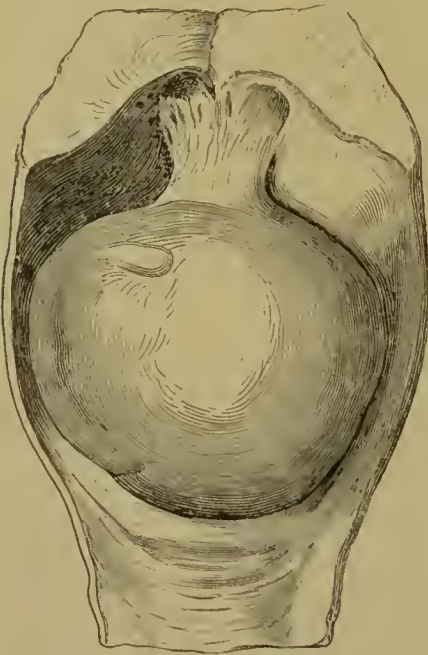
When the tumor projects from the top or anterior wall of the uterus, the latter is retroverted as soon as the growth has attained considerable size. The growing of these tumors thus in the pelvis gives rise to distressing vesical and rectal irritation, and often to retention of urine, to the narrowing of the calibre of the rectum, to constipation, to hemorrhoids, and to anal fissure. Besides this, there is often pain in the course of the sciatic or crural nerves of either side. The irritation and obstruction to the circulation, both from the mechanical presence of the growth and the malposition of the uterus, have in those cases which I have observed produced profuse bleeding at and between the menstrual epochs. That such was the pathology I have frequently proved by putting the patient in the knee-chest position, pushing the tumor and uterus up, and supporting them with pledgets of cotton saturated with glycerin, and by the free use of large quantities of hot water thrown against the vault of the vagina after the replacement was effected. Thus I have cured long-continued hemorrhages the result of this variety of the fibro-myoma. Once the tumor has become subperitoneal, it may contract adhesions to the pelvic viscera against which it rests, and thus it often happens in abdominal section that we find these tumors nourished by large blood-vessels entering them through adhesions, which, when the tumor is large and projecting into the cavity of the abdomen, frequently contain veins of enormous size. Twisting of the pedicle when long in these tumors may occur as in the ovarian tumor. If a new blood-supply has been, prior to this accident, established, the tumor will not die, even though it may be eventually separated entirely from the uterus. When this variety of tumor drags the uterus upward, or when the base of the pedicle is broad and the tumor falls backward, bending the uterus, the cavity is increased in depth; as the pedicle becomes elongated the uterine cavity shortens whether the tumor decreases in size or not. I have seen the uterus flattened out completely and adherent to the side of the tumor. After it has contracted adhesions to the intestine any rotary motion of the tumor is liable to produce intestinal obstruction and to demand immediate operative interference to save the life of the patient. Recently I have removed enormous fibroid tumors from which it was necessary to detach several loops of the small intestine. This variety of tumor is frequently accompanied by others of the same variety, either also expelled from or still existing in the walls of the uterus. The greatest limit of growth as a rule for this variety is the size of an adult head, but they have been met with having a weight of fifty to sixty pounds.

*Submucous Fibro-myomata* (Fig. 163).—As already stated, at least two varieties originate in the walls of the uterus as round tumors; when forced toward the lining membrane of the uterus they become submucous. As they project into the uterine cavity they carry the lining



membrane before them. The pedicle of this, the polypoid variety of the tumor, may be thick, containing muscular tissue, the lining

FIG. 163.



Submucous Fibroid.

membrane of the uterus, and very small blood-vessels. As long as the tumor lies beneath the unupheaved uterine lining it is round, but after it enters the cavity of the uterus and is macerated in constant discharge, and pressed upon by the contracting uterine walls, it becomes pear-shaped, or if nipped near the centre by the fibres of the internal os it may resemble a dumb-bell or hour-glass. This variety of the myomata does not undergo cretaceous degeneration, and is usually expelled too soon to undergo cystic degeneration.

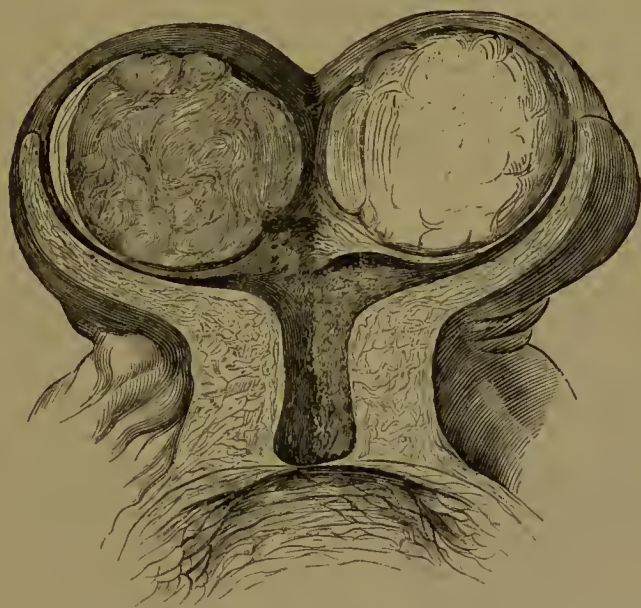
Cystic degeneration occurs rarely in this variety, but it has been met with by Schroeder and others, and I know of one case. Nevertheless,

it is probable that lives are as often lost from hemorrhages occasioned by this variety as by either of the other varieties of the myomata. This variety drags down the uterus when of moderate size, and after expulsion from the uterus may by its weight as it descends drag the fundus uteri down and invert the uterus. Women often hide these growths, even after they appear at the vulva, and I have known one woman to carry one for a long time dangling by a very thin pedicle between her legs. The size of the growth is determined mainly by the length of time it remains in the uterus or vagina. When in the vagina I have known the tumor mistaken for an inverted uterus, and verified the error by removing the tumor.

*The Intramural or Interstitial Fibro-myoma* (Fig. 164).—This variety simply remains and grows within the uterine walls. Surrounded on all sides by uterine tissue, it receives a greater blood-supply than either of the other varieties. It consequently grows with greater rapidity, and often to an enormous size, enlarging a patient like a full-term pregnancy, and weighing twenty pounds and upward. The great weight stretches the anterior wall of the belly, and the tumor overhangs, while it rests upon the pelvic brim. The abdominal walls grow very thin from pressure, and the recti muscles atrophy and separate, and the tumor lies immediately under the superficial tissues of the

belly-wall. These tumors, bulging out the uterine laterally, spread apart the layers of the broad ligaments, and the tubes are spread out high up on the tumor, or the uterus and the tumor may develop in such a way as to entirely alter the relative position of the uterine appendages. In these cases the cavity of the uterus is deepened or shortened and often rendered crooked, while at the same time it is very difficult

FIG. 164.



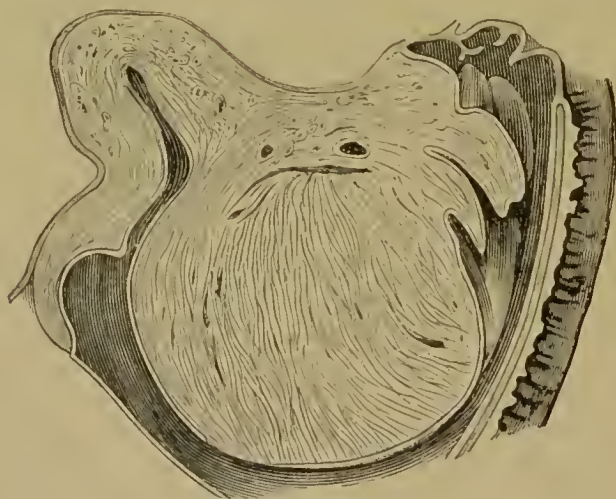
Intramural Fibroid.

to find the os uteri in the vagina. These externally large tumors are usually single, and the walls of the uterus may be found either greatly hypertrophied, or in old subjects much atrophied. These tumors occasionally undergo cystic degeneration, and a few years ago, by post-mortem, I removed one which, with its fluid contents, weighed more than sixty pounds. The patient died from exhaustion associated with brown atrophy of the heart—a condition certainly not infrequent.

*Fibro-myoma of the Cervix Uteri* (Fig. 165).—These tumors follow the same law as to location and development that they do in the body of the uterus. They may be subperitoneal when developed in the supravaginal portion; when developed too low down they very rarely appear upon the outer surface of the cervix—viz. the outer surface of the vaginal portion. The growth is much more rare in the cervix than in the body. In the twenty-two years I have been in practice I have met with but three cases where the growth was in the cervix. In one the growth was submucous, and in a second interstitial and as large as a

lemon; in the third the tumor was as large as a foetal head. Where they become submucous they are gradually forced into the vagina, retaining their uterine connection through a pedicle of varying density (Fig. 166, *b*). When interstitial and large they pack the pelvis to a great extent. The lip of the cervix invaded is spread out over the growth, while the opposite lip is thinned and stretched as a band along the circumference of its enlarged neighbor. The uterus is dragged down until the growth has become large, when its fundus is deviated at first in a direction corresponding to the lip of the cervix invaded. When the tumor is expelled from the cervix it will be oval or round-ended, and when pouting between the labia may readily be mistaken for the fundus of the inverted uterus (Fig. 166, *a*). On the other hand, the uterus has been mistaken for this variety of fibro-myoma,

FIG. 165.



Fibroid in Cervix Uteri.

and by the late Washington L. Atlee was cut off with the *écraseur*, the patient recovering. Large growths in the cervix are more liable to produce vesical and rectal symptoms than those growing either from the posterior wall or fundus of the uterus.

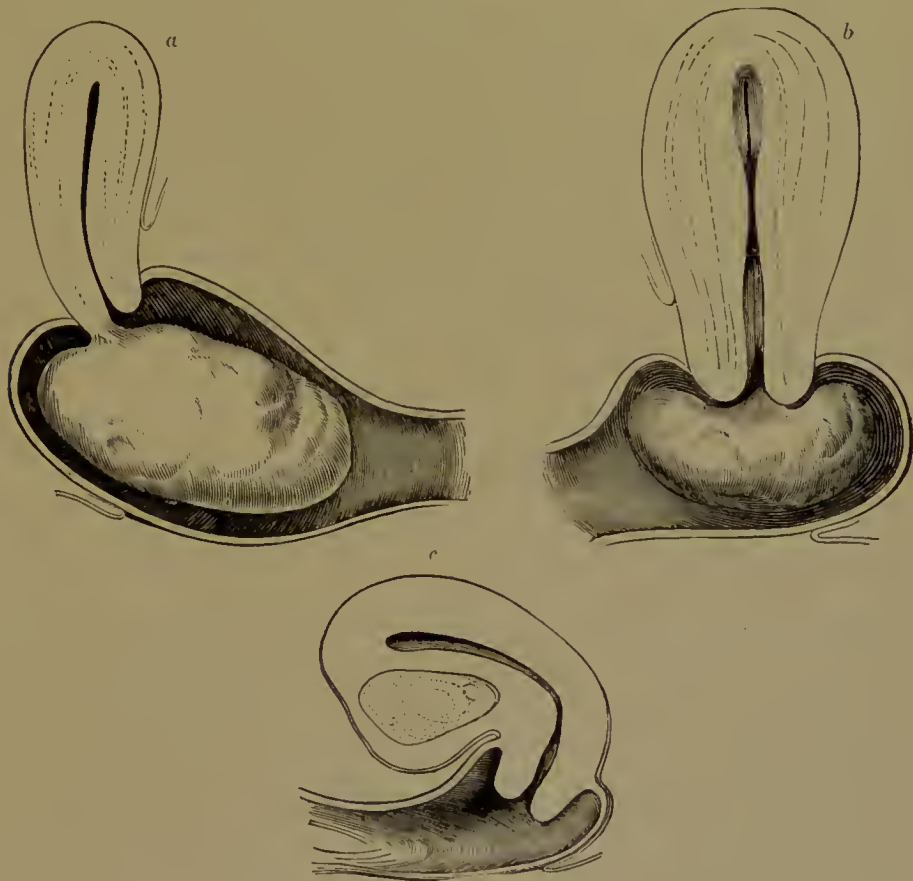
**SYMPTOMS.**—The symptoms which accompany the presence of these tumors in their various localities and stages of growth are widely different, as we shall learn in considering the diagnosis. However, a class of indications are patent as found in a vast majority of the cases, and may be tabulated as follows:

- A. Vague pain in the pelvic region;
- B. Pain referred to the front or back of the leg;
- C. Irritability of the bladder or rectum;
- D. Uterine tenesmus;
- E. Menorrhagia or metrorrhagia;

- F. Dysmenorrhœa ;
- G. Profuse leucorrhœa ;
- H. Serous discharge from the uterus.

The disorders of menstruation, the tenesmus, the leucorrhœa, and the serous discharge, are typical, within the menstruating age, of the existence of the submucous fibro-myoma, and in a less marked degree in the interstitial variety. They may be entirely absent in the subperitoneal

FIG. 166.



Fibroids attached to Cervix in Vagina.

variety. It may be inferred as a rule in diagnosis that tumors producing these symptoms to a marked degree are situated immediately beneath or close to the lining membrane of the uterus. Exceptions to the rule do occur, for I have seen free hemorrhages accompany the existence of a subperitoneal fibro-myoma packed in the pelvis.

Progressive anæmia from loss of blood, feeling of weight, and depression of spirits, the development of unusual nervous conditions, irritability, loss of cheerfulness, and gloomy apprehensions, are frequent. When the tumor rises out of the pelvis it may be easily felt



through the abdominal wall. If cystic degeneration has occurred, spurious or true fluctuation may be present; but absence of the symptoms will not be proof that cystic degeneration has not occurred.

DIAGNOSIS.—Scarcely is it possible to name anything more difficult than the diagnosis of the very small fibro-myomata when many of the leading symptoms are absent. This is sure to be the case with sub-peritoneal growths, and the surgeon is left entirely to exploratory skill. If the tumor has retroverted or anteverted the uterus, and become at all prominent upon either surface, bimanual palpation with a finger in the vagina or rectum will usually determine its existence. With a finger in the vagina or bladder its existence on the anterior wall, especially if the patient be thin, will be generally easily determined. If the patient be fat, it will be necessary with the volsellum forceps to pull down the uterus, so that the finger in the rectum may be swept over the posterior surface of the uterus, or the sound may be well curved and made to drag the uterus well forward against the finger in the vagina or bladder. The tumor, if at all defined, will present an outline within which the tissue is harder than that of the normal uterus; if well defined, it will be easily recognized. Even at so early a date the uterine cavity is often found deeper than normal, and the uterus congested and abnormally heavy. When the tumor springs from the supravaginal portion of the cervix, it is readily felt through the vagina. But if it be from the posterior wall of the fundus, and of considerable size and firmly adherent in the cul-de-sac, a sound in the uterus may or may not enable the examiner to determine that the growth is or is not attached to the uterus, or, if it is so attached, that it is a myoma. The direction taken by the sound and the consistency of the growth are the questions to be considered. The round form and solid feel of the myoma will aid in differentiating it from a hæmatoecle or ovarian cyst, but it is not possible to differentiate it from a solid tumor of the ovary which is adherent to the uterus. Twice I have seen the abdomen opened, once by Billroth and once by Mr. Lawson Tait, for supposed myoma of the uterus, to find the tumor a solid one of the ovary. The differentiation from a cyst is less difficult; its elasticity, its rare close connection with the uterus, and its softer feel, are patent points. But if doubt exist the aspirator-needle may be used. A few years ago I thus diagnosed an ovarian cyst which had been diagnosed a fibro-myoma, and for which the woman was taking muriate of ammonia. Dr. Thomas of New York subsequently removed the tumor, confirming my diagnosis. When the tumor is interstitial and very small it will be extremely difficult, if not impossible, to determine its presence.

The existence of some of the symptoms alphabetically tabulated may give good presumptive evidence; in addition, the uterus may

be deeper than normal, or it may be possible for one of unusual skill to determine by the aid of the sound that one wall of the uterus is thicker than the opposite wall or that a portion of the wall is more solid or thicker. If the tumor is small and in the anterior wall of the uterus, the canal will be so displaced backward that the direction taken by the sound will prove that the body felt is not the fundus of an anteфлекed uterus (Fig. 166, c).

When the tumor has attained a considerable size and other symptoms are present, and the possibility of enlargement from pregnancy, chronic metritis, and subinvolution are differentiated, the case is not difficult to determine. But given a small interstitial fibro-myoma associated with chronic metritis or pregnancy, and the diagnosis may be impossible. Time alone will solve it. Should, however, in early pregnancy the fœtus be dead and the woman present an enlarged uterus, with irregular periods of bleeding, a constant leucorrhœa, or flow of disagreeable odor, the case may be mistaken for a fibro-myoma, interstitial or submucous, and nothing except dilatation of the cervix and exploration with the finger will make a diagnosis possible. In chronic metritis the uterus is more or less tender; its walls are flat and soft; the os open, and frequently nausea exists. In cases of fibro-myoma the uterus is rarely sensitive, and especially when the growth is interstitial or subperitoneal, the body as well as the cervix is hard, and the os normal. If chronic cellulitis with extensive deposits be encountered, the uterus is fixed, while the reverse is usually the fact when the symptoms depend on a neoplasm. In early pregnancy the cervix and lower segment of the uterus are softer and the os more patent than normal; while in cases of fibro-myoma the cervix and os usually remain unchanged and the tumor is hard.

Further, in bimanual palpation the pregnant uterus will be found soft or elastic, symmetrical, and nearly in the central line; in cases of even small fibro-myoma it will be hard, inelastic, and usually misplaced. In small submucous neoplasms the bleeding is usually so prominent a symptom that the introduction of a sound or dilatation of the cervix and introduction of a finger will suggest themselves as the speediest way to decide the diagnosis. Having excluded pregnancy, and no tenderness existing in two cases of suspected neoplasm, I introduced a strong curette and broke off the pedicle; in both cases the polypus was expelled on the following day, the cases giving me no more trouble. In a submucous growth, with the cervix dilated sufficiently to admit the finger, the diagnosis should not be difficult. When the tumor grows from the intravaginal portion of the cervix, if interstitial its early symptom is simply an enlarged lip; but later its solidity, freedom from tenderness, its circumscribed hardness, and the absence of the evidence of malignant disease will warrant an

incision into the lip and an enucleation of the growth at the same time that the diagnosis is made. When the small interstitial fibroid is low down, its development toward the os externum enlarges the lip beneath it and protrudes it forward into the vagina. The opposite lip is spread out and the os loses its form, becomes a slit, and may be very difficult to find. When the neoplasm is entirely in the cervix the same difficulty will occur. The liability of mistaking such cases for inversion of the uterus is to be guarded against. A retroflexed or anteverted uterus has frequently been taken for a fibro-myoma. The groove presenting to the examining finger between the neck and the fundus misleads; but the sound and bimanual examination will determine whether the round body felt is the fundus or a fibro-myoma. If the neoplasm arise from the posterior wall, the uterus is retroverted, and the bimanual method of examination will enable us to trace its close connection with the uterus unless the pedicle be unusually long. If, however, the uterus and tumor fill the pelvis, the patient should be placed in the knee-chest position, or, better, in Sims' position, with the side of the table elevated. The uterus and the tumor may now be pushed upward and forward out of the pelvis. A sound may then be introduced into the uterus and held with the thumb and fore finger of the right hand; the left hand, passing over the patient's hip, can grasp both uterus and tumor, and their connection may be determined by the movements of the sound. If the tumor can be grasped separately and moved without affecting the position of the uterus, it cannot be uterine; but if its movements as determined by the sound do affect the position of the uterus, it is attached to the uterus and probably of uterine origin. In thin subjects especially the sound may not be required; but bimanual examination with two fingers behind the cervix will enable the examiner to determine a close connection between the tumor and the uterus, or decide whether or not the tumor and uterus move together. But as it is the early development of fibro-myomata that will always give the cases most difficult of diagnosis, a more lengthy examination of this subject will be required. A case or cases presenting in which no change in the os or cervix has occurred, with no displacement, either retro- or anteversion or prolapsus, with or without much increase of the depth of the uterine cavity, with no marked elevation of either uterine wall to be felt bimanually, but with disordered, painful menstruation or irregular discharges of mucus or blood or the watery discharge of serum, will try the skill of the best diagnostician, and frequently compel him to summon time to his assistance. These symptoms, however, should always put us on the alert. All growths of this nature are at first supposed to be interstitial, but if they are not or become submucous the leading clinical features of the case will be disordered menstruation, bloody dis-

charges at irregular periods, and the presence of leucorrhœa consisting of mucus more or less watery. If, however, the tumor be developing toward the peritoneal coat of the uterus, these symptoms may be entirely wanting, and pain usually present between the periods, and especially severe at the periods, may be the only symptom present. Meadows has observed that the location of the pain is much determined by the location of the growth. "If the pain is felt in the lower dorsal or upper lumbar region, then it is probable that the tumor is growing on the fundus uteri. If, on the other hand, the tumor is more confined to the body of the uterus, then the pain will be felt in the lumbar region above; and, lastly, if the cervix be the seat of the disease, the pain will be felt mostly over the sacral region." Pain due to ovarian disease, like the neoplasms of the ovary, is to one or the other side of the central line; due to uterine neoplasm, it is in the central line. Small ovarian neoplasms are not always accompanied by menstrual disorders and irregular discharges. Where the tumor is subperitoneal, and pain and displacement alone point out a suspicion of its presence, we must wait until further development occurs. Later, the tumor may be made out, and the differential diagnosis from chronic metritis and pelvic cellulitis may be at once determined by the absence of sensitiveness to the touch of the finger; hæmatocœle may be ruled out by the absence from the history of its sudden invasion with symptoms of shock: the slow growth of the tumor, its irregularity and solidity, are characteristic of fibro-myomata. Should, however, amenorrhœa be present, the density of the tumor, and possibly its irregularity, the asymmetrical condition of the tumor and the uterus together, the deviation of the uterus from the central line, the absence of changes in the mammary glands, the presence of a serous leucorrhœa of a peculiar odor, will usually lead to a correct diagnosis. Supposing the tumor and the uterus to be still in the pelvis, the uterus will be crowded to one side; or, if pulled down by the descending tumor, it will be retroverted, while the cervix is crowded forward; or, if the tumor proceed from the anterior wall, the uterus will lie retroverted beneath or to one side of the tumor. If the tumor has become so large as to lie above the pelvis in the cavity of the abdomen, the uterus will be dragged up and its cavity lengthened. While the tumor occupies the pelvis the pressure is extended to the bladder and rectum, and both retention of urine and difficult defecation are frequent. The ureters may also be so interfered with by the presence of the tumor and uterus as to convey a diminished amount of urine to the bladder: with this condition I have seen almost complete suppression of urine, but after the tumor was lifted out of the pelvis the flow of urine became greater than normal for a day or two. The presence of free fluid in the cavity of the abdomen is not very frequent, but when



it does occur by reason of the presence of the tumor, it may come from irritation of the peritoneum or from the tumor itself, the soft or œdematous variety. Adhesions are the result of partial or general peritonitis, usually the former when a fibro-myoma occupies the pelvis: it is important to guard the patient against these attacks, for if adhesions take place the tumor will be bound down firmly in the pelvis and all the symptoms resulting from such incarceration will follow. The mechanical irritation of the tumor produces peritonitis, which may involve that portion of peritoneum covering the tubes, and the adhesions which follow may shut off the canal of the tube; or the pressure of the tumor may shut off the uterine canal and sterility result; or the irritation of the tumor may produce so much congestion of the uterus as to set up the condition known as chronic metritis—viz. congestion with hyperplasia. When this is the case the symptom of pain is much increased, and bleeding will occur.

It is not uncommon at the menstrual period to find the tumors and uterus more enlarged than ordinarily, and I have a case now in which at these times there has frequently been retention of urine requiring the catheter. We may recapitulate the symptoms of the solid, subserous fibro-myomata thus:

- A. Uterine displacement;
- B. Pressure upon or irritability of the bladder and rectum;
- C. Bearing-down pain and backache;
- D. Uterine tenesmus at the menstrual period;
- E. Serous leucorrhœa with or without peculiar odor;
- F. Pressure on the crural nerves and blood-vessels;
- G. Increased depth of the uterine canal;
- H. Occasional retention of urine;
- I. Sterility;
- J. A solid, non-sensitive tumor;
- K. Mobility of the tumor and uterus together;
- L. Ascitic fluid in the abdominal cavity.

Of these symptoms, nearly all will be found in those cases where the growth nearly fills the pelvis, and nearly all of them will be wanting if the growth is too large to enter the pelvis, and therefore lies above it. In one case the patient may be suffering from nervous irritability and a disorder of all her functions to a considerable extent; she may be confined to her room, locomotion being painful. In another case, the pelvis being but little encroached upon or entirely empty, the patient may have no symptom of suffering and enjoy tolerably good health. When the tumor and uterus are above the true pelvis in the cavity of the abdomen their connection is usually easily determined by bimanual

examination without the aid of the sound. If cystic degeneration has occurred, palpation may detect it, and aspiration will produce a fluid having in it the fibre-cell or a fluid coagulating on exposure to the air, or blood alone may be drawn. The cavity of the uterus will likely be found lengthened, and the connection between the tumor and the uterus may be determined by seizing the latter with a volsellum forceps while an assistant seizes the tumor; alternate pulls by each other will determine a connection with the uterus, but it will not determine positively that the tumor has not had another origin and formed a uterine attachment. In such cases the proper method of diagnosis is by an exploratory incision.

*Interstitial Fibro-myoma, Solid Variety.*—As in the case of the subserous variety, the earliest symptoms will be uterine displacement with vague symptoms of but little certainty. As the tumor increases, if in the anterior wall, ante flexion at first, and later retro flexion, will occur. If in the posterior wall or at the fundus, retroversion will soon follow. The uterus in all varieties, by increased weight, partly due to the growth and partly to increased blood-supply, will descend to some extent. As the tumor grows dysmenorrhœa, menorrhagia, and leucorrhœa develop.

The irritation of the growth hastens uterine tenesmus, and that organ, becoming congested and heavy, sags down in the pelvis. As the tumor is increased the uterine canal is pressed upon; the symptoms of pelvic engorgement spoken of in the last section occur, and continue until the tumor and uterus, by reason of their size, are lifted up out of the pelvis. The introduction of a sound, or, better, bimanual examination, proves the growth to be the uterus enlarged by the tumor. Disordered blood-flow from the uterus and leucorrhœa more or less serous are the other symptoms most generally encountered.

*Fibro-myoma of the Cervix.*—Here the symptoms differ from the others in this, that menorrhagia is not so frequent, endocervicitis is more common, and the enlarging lip of the uterus is in sight if a speculum be used, and within easy reach of the finger. The differential diagnosis involves the malignant growths of the cervix, hyperplasia of the cervix following laceration, and inversion of the uterus. The tumor, if pedunculated, may be traced to its connection with the uterus. The consistency of the growth, its want of sensibility, the inability to separate it from the uterus by bimanual examination, the difficulty of finding the os, the fact that it has lost its normal or usual contour, the slow growth of the tumor, the presence of the uterine fundus beyond, the absence of all cachexia, the fact that the growth is of sufficient size to impact the pelvis, will clear up the case. Should it be deemed necessary, however, an incision into the growth, under proper and careful preparations, can be safely made and its nature fully diagnosed. Should

the tumor prove to be the uterus itself, in the hands of a good surgeon no injury would result.

*Submucous Fibro-myoma.*—The inception of this variety may be early followed by dysmenorrhœa, menorrhagia, metrorrhagia, leucorrhœa, and serous discharge, uterine tenesmus, and displacement, the symptoms steadily increasing with the growth of the tumor. Occasionally menorrhagia and metrorrhagia are wanting. The uterus enlarges, its cavity increases in depth, and its walls become heavier, and because of increment in weight it sinks in the pelvis. Sterility is always present, while in the subserous and interstitial varieties pregnancy may occur. Anæmia, neurasthenia, dyspepsia, great depression of spirits, and prostration often rapidly follow, and unless the patient is relieved of the tumor, either by nature or her physician, she will surely die. Should the patient not get rid of the tumor early, it may so enlarge the uterus by its growth that the former is lifted out of the true pelvis, and may, despite the symptoms, enlarge to any extent, bearing a ratio to the patient's powers of sustaining life.

GENERAL REMARKS.—Solid fibro-myomata are readily differentiated from ovarian cystomata and fluid accumulations in the cellular tissue of the pelvis by the entire absence of fluctuation, their slow growth, their connection with the uterus, and the marked derangements of the functions of that organ. From solid tumors of the ovary it is not always possible to differentiate them, and, as already noted, I have seen both Billroth and Lawson Tait open the abdomen for a supposed uterine tumor and find instead a solid ovarian tumor. The moving about of the solid ovarian growth may move the uterus, and give the idea of a uterine tumor with a long pedicle. The most difficult diagnosis is encountered in very small subserous and interstitial tumors. But time or the bimanual method of examination carefully employed, or pulling down the uterus with a volsellum and retroverting it toward the examining finger in the vagina or rectum, will sooner or later discover the small growth. If it be subperitoneal and located on the anterior wall, and producing symptoms of stone in the bladder, I see no objection to dilating the urethra, dragging down the uterus, passing the finger into the bladder, and examining both bladder and the anterior wall at the same time; or, if there be no other way and the case is urgent, the bladder may be opened as if for drainage, and the finger introduced and passed along the anterior wall of the uterus. The interior of the uterus may be reached with the finger only after thorough dilatation, which may be accomplished with Molesworth's dilator or the metallic dilator of Marion Sims or Dr. Wilson, either after or before division of the vaginal portion of the cervix.

Previous to entering upon either of the above-described processes the bowels should be completely cleaned out, and all pelvic congestion

further relieved with the hot-water douche, and the last may be continued as a safeguard after the procedure. Both anteflexion and retroflexion of the uterus have been mistaken for fibro-myoma. The uterine probe will locate the position of the fundus in either case, and careful manual palpation will further solve the problem. Fecal accumulations in the caput colli or sigmoid flexure would not follow the movements of the uterus, and would be affected by enemata and cathartics. Pelvic hæmatoecle is of sudden appearance, accompanied by evidence of loss of blood; the tumor is fixed and painful to the touch. Pelvic cellulitis produces a painful swelling which soon fixes the uterus, rendering efforts to move it painful; the temperature rises and examinations are painful; the vagina is hot and the pulse beats perceptibly in the vaginal arteries.

These constitute the main clinical features, differential and otherwise, of solid fibro-myomata of the uterus.

CAUTION.—The uterine sound as an aid to diagnosis is beyond doubt valuable. Its use is entirely precluded in case pregnancy exists. It should be used with the utmost care and without the exercise of any force. The direction of the uterine canal should be first determined by means of a flexible silver probe, which may also be used as a substitute for the sound. In early experience I was in the habit of using the sound, but later the probe, and for several years have used neither. An extensive experience in bimanual examination will enable any one to dispense with the use of many instruments with advantage.

PROGNOSIS.—These tumors frequently cause death. Relatively, they are innoxious in the following order: subperitoneal, interstitial, cervical, and submucous. The last is probably the most dangerous, for it is almost always accompanied with great loss of blood; even a very small tumor may cause fatal bleeding. Yet, although many of these tumors are, as a rule, not dangerous to life, they are liable at any time to cystic degeneration and to set up a train of evils demanding an entirely different consideration. The tumors occasionally disappear, as already stated, after the menopause or pregnancy. In fact, this is their natural history. When submucous they are frequently expelled through the vagina as polypi. When the capsule ruptures under expulsive effort, they escape in mass or break down and are expelled piecemeal; ulceration of the capsule from any cause favors such a result. Nevertheless, these tumors occasionally destroy the patient through the advent of suppuration or necrosis of the tumor, producing septic poisoning, or uræmic poisoning may occur from pressure upon the ureters; fatal peritonitis may result from the irritation of the tumor; or a fatal hemorrhage may ensue; or the long continuance of discharges may exhaust the patient; or their continued pressure upon the nerves and ganglia



may finally wear out the stoutest nervous system. The symptoms are so liable to change from year to year that a guarded prognosis is wise.

### FIBRO-CYSTIC MYOMA.

As already intimated, the foundation of every fibro-cystic myoma is a solid fibro-myoma, either uninodular or multinodular. The latter undergoes cystic degeneration to produce the former. The fluids formed in these tumors consist largely of serum, mucus, blood, fat, or lymph, and occasionally pus, and are not confined in true cyst-cavities. The tumor may be infiltrated with serum to such an extent as to give a palpation so like fluctuation that even after the tumor is removed it is difficult to believe that it is not a cyst. The serum is contained in innumerable small spaces formed by spreading the meshes enclosed in the fibrous tissue. When the lymphatics entering the tumor or passing between the centres of the multinodular variety dilate, the fluid accumulates often in a large quantity ("fibro-myoma lymphangiectodes" of Virchow). This fluid coagulates on exposure to the air. The formation of mucus in these tumors is more difficult to account for. This form of degeneration does occur and a fluid rich in mucin accumulates. No mucous glands are found, and it is possible that the fluid is the result of a "mucous metamorphosis" of the protoplasm or a separation of the fluid by independent cell-action. The presence of blood in the tumor is not so difficult to understand when we remember that occasionally large vascular sinuses penetrate these tumors, and an apoplectic condition, with subsequent clot, disintegration, and softening of the adjoining structure, may occur. Fatty degeneration and consequent softening have already been spoken of at length. Suppuration in these tumors, though rare, does occur. Recently, by post-mortem, I removed an enormous one, and it contained pus as well as other fluids. The subperitoneal and interstitial varieties are most prone to softening, while the submucous variety is not exempt from it. The tendency in these tumors, where the softening arises from infiltration with serum, fat, or blood, is toward enlargement, but subsequent absorption of fatty softening occurs and tends to recovery. The enlargement from serous or apoplectic infiltration is not of definite limit and may not always endanger life. The enlargement from mucous degeneration and the accumulation of lymph seems to produce the tumors, which advance steadily in growth until the life of the patient is jeopardized and extirpation is no longer a matter of choice. The rule, however, may be laid down that any fibro-myoma which gives evidence of fluctuation and progression should be removed without delay.

DIAGNOSIS.—The diagnosis of these tumors presents always a question of origin. It also involves the rules of differentiation to be

observed in the diagnosis of ovarian cysts. In the latter the uterus is found displaced downward and backward or forward; in the fibro-cystic uterine myomata, if large, the uterus is dragged upward; often the uterine cavity is lengthened, and a sound introduced into it will, when the tumor is moved about, move also, proving the connection between the tumor and the uterus. The tumor must be differentiated from pregnancy, but occasionally these patients are beyond the childbearing period. The shape, size, duration of the tumor, and effect on the health of the patient are important points. The history of the case pointing to the prior existence of a uterine tumor, and the age of the patient, not usually more than thirty-five years, are vital points. The question may be positively settled by the aspirator-needle, which will emit fluid having microscopically characteristics entirely different from those found in ovarian cysts. Free fluid in the cavity of the abdomen is more frequently found than in the case of ovarian cysts, and by reason of the greater solidity aortic pulsation is probably more frequent. Even if the patient be within the menstruating age, menorrhagia would not likely be met with in ovarian tumors. Unlike ovarian tumors, fibro-cysts are not met with in patients under thirty-five years of age. They grow very slowly, and the general health of the patient sympathizes with their presence at a later date. The expression of countenance and the emaciation seen in large ovarian tumors are quite different. The face is often florid even when the tumor is large, and does not betoken the great danger of the patient. The emaciation comes on later than in ovarian tumors. Elasticity in the tumor may precede fluctuation. The varicose condition of the abdominal veins is rare in these cases, but frequent in ovarian cystomata. Aspiration of these tumors, in which the cysts are supposed to arise from obstruction of the lymphatic vessels, gives a fluid limpid, yellow, and fibrinous as lymph, which coagulates as it flows into the basin. But when aspirated the cysts produced by œdematous infiltration give a fluid yellow and serous which does not coagulate when exposed to the air. The fluid of this variety may be tinged with blood; if, however, much blood is drawn from such a tumor, it may be from having opened a blood-sinus, such as Virchow describes as having met within them. Coagulability of the fluid was long ago described by Dr. W. L. Atlee as diagnostic of the fibro-cystic myoma. In the fluid drawn from the œdematous variety the fluid microscopically presents nothing more than the ordinary constituents of fibrinous serum. The walls of a uterine fibro-cystic myoma are darker and more vascular than those of ovarian cysts. The uterine muscular fibre in the interstitial variety composes the cyst-wall, and uterine sinuses are the blood-channels. The adhesions formed by these tumors are often immense—broad bands of tissue, often very vascular; large plexuses of immensely-

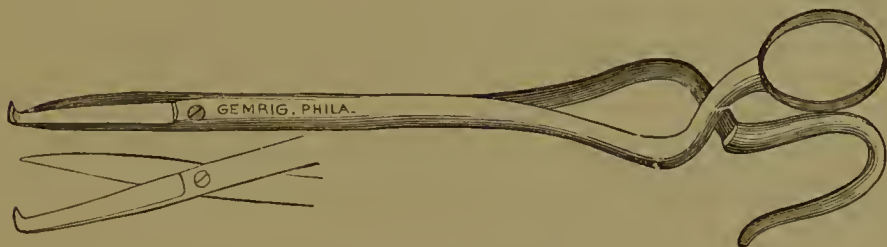
dilated mesenteric veins are seen adhering to the tumor, and occasionally the broad ligaments and tubes are spread out upon their walls like great vascular wings. The bladder is often adherent to the front of the tumor and dragged high up on the abdominal wall.

**MEDICAL TREATMENT.**—Medically, but little can be done for the relief of patients suffering from fibro-myomata, and nothing for those suffering from those tumors which have undergone cystic degeneration. Many remedies have been given for the cure of solid tumors of the uterus; prominent among these is ergot and its preparations. Hildebrandt established its use hypodermically, and reported favorable results. I have tried it with many others, and have arrived at the following conclusions with reference to it: Given by the mouth, rectum, or hypodermically in large doses, it is an excellent remedy for the relief of the hemorrhages. In one case in which I gave one hundred and five consecutive hypodermic injections, it condensed the uterus and arrested the growth of the tumor. This tumor was subperitoneal. Few patients can endure a sufficiently large number of injections to do them any good. The deeper into the cellular tissue and fat the fluid is injected, the less pain and danger of subsequent inflammation and suppuration. I never saw it produce a cure. Professor Byford of Chicago relies on it in very large and frequent doses to expel the submucous and polypoid variety of the tumor, and his experience thus far is good. In addition to ergot, bromide and iodide of potassium, chloride of calcium, arsenic, and phosphorus have been largely used; the same may be said of chloride of ammonium. I have used all extensively, except the chloride of calcium, and have seen no cure result in a single case. If the physician can keep the tumor out of the small pelvis, relieve rectal and vesical irritation and congestion by resorting to elevation of the tumor and uterus by the knee-chest position daily and by copious douches of hot water, in some cases he will afford great relief, diminish the hemorrhage, and nurse his patient beyond the menopause or keep her in better condition to bear surgical treatment. Thus I nursed one patient sixteen consecutive years, keeping her fairly comfortable. She has now ceased to menstruate and her tumor is becoming smaller very slowly.

**SURGICAL MEANS.**—As Ephraim McDowell of Kentucky secured for American surgery the honor of establishing ovariectomy, so the late Washington L. Atlee inaugurated, by the publication of a paper entitled *The Surgical Treatment of Certain Fibrous Tumors of the Uterus* in 1853, a pioneer movement in the treatment of fibro-myomata which is still advancing. So truly is this the fact that Professor Thomas wrote in 1880: "With the means at present at our command all the variety of fibroids, the submucous, interstitial, and subserous, are amenable to extirpation." There are but two routes by which these

solid uterine tumors can be removed—either through the vagina or by laparotomy; with the exception of small tumors with a well-defined pedicle all suprapерitoneal fibro-mymomata are reached only by section of the abdominal wall. I have once divided the posterior wall of the vagina, and through this opening delivered the tumor. I saw Martin of Berlin also open the peritoneal sac in removing, *per vaginam*, a small

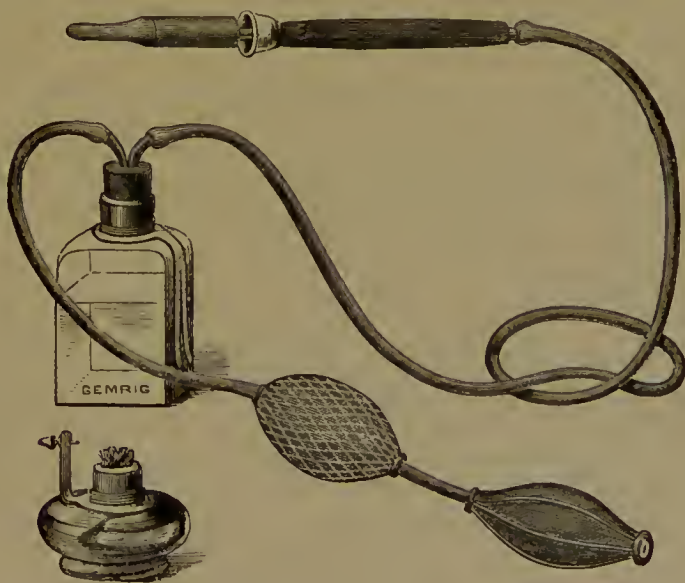
FIG. 167.



Kuchenmeister's Scissors.

subserous growth standing at the vaginal junction. The tumors properly removed through the vagina are polypoid, submucous, and interstitial. If the cervix has been dilated from within out by the pressure of the tumor, and it remains only to dilate the os externum, the avenue

FIG. 168.



Paquelin's Cautery.

to the tumor is easily made patent. But if the cervix is undilated in its entire length, means must be employed with proper precautions and care to dilate it. The bowels should be cleared out and local congestion relieved by frequent douches of hot water. The cervix may now be



divided, as far as the vaginal junction, with the scissors (Fig. 167), as Meadows has advised, or with the Paquelin cautery-knife (Fig. 168) still higher, as Professor Thomas advises. Immediately or after a week of delay, the patient's condition having been still further improved by appropriate treatment, we may proceed to dilate the now shortened and weakened cervix. If the growth seems free to advance, ergot may be given until the canal is sufficiently open to admit an instrument, with which the growth is seized, and traction should be made to assist the uterus to expel it. The importance of traction in the delivery of these tumors was insisted on by Dr. Thomas Addis Emmet years ago. If, however, the tumor is not free in the uterine cavity, it may project sufficiently to enable the operator to sink a double tenaculum into it, and still assist its final delivery by traction. If, however, it is necessary to provide for easier access to the cavity of the uterus, we must select means to effect it.

If the tissues are tolerably soft, we may proceed at once, under an anæ-

FIG. 169.



Sims' Dilator.

thetic, with Marion Sims' (Fig. 169) or Dr. Wilson's large metallic dilator (Fig. 170) or Molesworth's hydrostatic dilator (see Vol. I. Fig. 134),

FIG. 170.

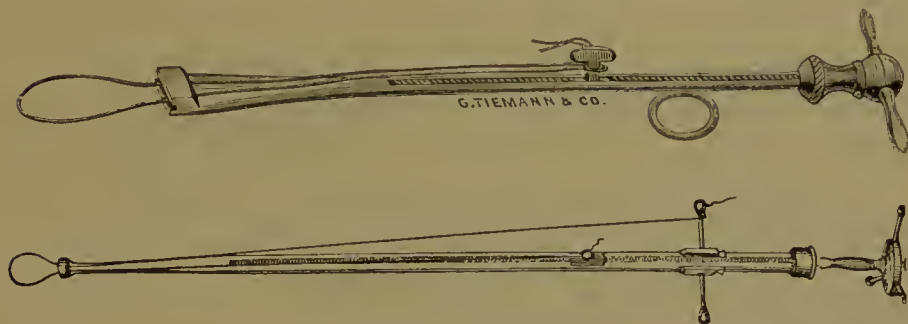


Wilson's Dilator.

with a fair prospect of success. If, however, resistance is well marked, more gradual dilatation, with tupelo or laminaria or sponge-tents, carefully made antiseptic with carbolic acid and finally smeared with iodoform paste, should be substituted. The avenue once open, it should be

thoroughly disinfected: the subsequent steps will depend on the location of the growth and its attachments to the uterus. If it be pedunculate, it should be seized with strong forceps and an attempt made to secure its pedicle with the wire loop of the *écraseur* (Fig. 171) or the

FIG. 171.

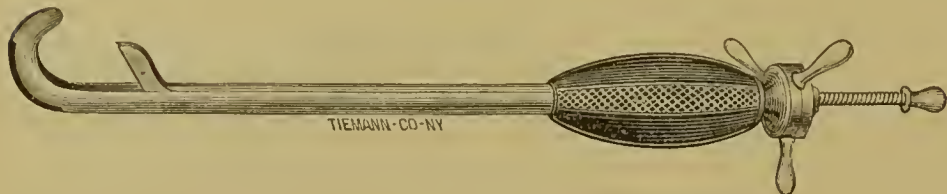
Forms of Wire *Écraseur*.

galvanic caustic wire, with the former of which it may be crushed off or with the latter burnt off; with the *polyptome* of Aveling or Sims the pedicle may be divided. Or it may be twisted off if the pedicle be slender. Once the pedicle is divided, it is delivered by traction, unless it be too large, when it must be reduced by cutting pieces out of it, or, as Emmet has advised, by making incisions into it in a spiral direction as the tumor is pulled down. If in the effort the uterus be inverted, reposition should be made immediately after removing the tumor. If, however, by traction upon the tumor with its uterine attachments unsevered the uterus is inverted, care should be taken not to cut off the pedicle with a sharp instrument, but with blunt scissors or with Paquelin's cautery, or, if possible, to separate the growth by enucleation. This precaution should be observed as a guard against subsequent bleeding after reposition of the uterus has been made. After dilatation of the cervix polypoid growths may be twisted off, or if their pedicles be sufficiently long to permit, the tumor may be dragged into the vagina, where the pedicle may be dealt with by means of the wire *écraseur*, blunt curved scissors, or the galvano-caustic wire; and in cases of multipara it may be easy to secure the pedicle with a ligature, and below it cut off the growth with any sharp instrument convenient. When the polypus is in the vagina, if not too large, a Sims speculum (see Vol. I. Fig. 121) may be slipped in and greatly expedite its removal. In cases of short pedicle, in addition to the means already spoken of, the *polyptome* of Aveling (Fig. 172) may be used to divide it, or the pedicle may be torn across with a stout curette or spoon saw.

When the cervix is dilated and the tumor found to have a broad attachment to the uterus or to be well imbedded, none of these procedures will avail anything, and the operator will now meet with real

difficulty. The object he must now attain is a method to open the capsule of the tumor. Before proceeding to this, however, he should weigh well the propriety of abandoning the attempt by the vagina for a subsequent removal of the ovaries and tubes after the method of Mr. Law-

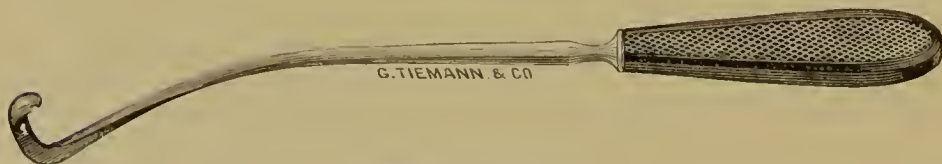
FIG. 172.



Aveling's Polypsome.

son Tait. If, however, he elects the more difficult and scarcely less dangerous method of enucleation, he will proceed somewhat as follows: The patient, well anæsthetized, is placed on her back, and an assistant forces the uterus well down toward the vaginal outlet. The operator now passes a finger into the uterus and locates the growth. Having done this, guiding a knife, a probe-pointed bistoury, or a pair of scissors on his fingers to a point selected, he cuts through the capsule by as free an incision as possible. With the finger and enucleator of Simpson (Fig. 173) or of Sims (Fig. 174), or with Thomas' spoon-saw

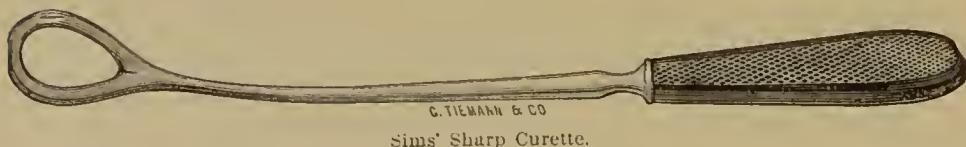
FIG. 173.



Simpson's Enucleator.

(Fig. 175), he peels back the capsule, separating the tumor from its attachments as far as possible. At this juncture he may desist and

FIG. 174.

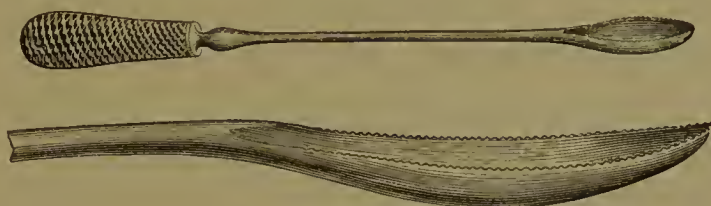


Sims' Sharp Curette.

give ergot—a dangerous experiment—for the tumor, now largely cut off from its base of supplies, will probably slough and poison his patient. It is better to proceed, and with strong volsellum forceps or Sims' large tumor-hook (Fig. 176) drag the tumor into the vagina, or, if it be too large, cut pieces out of it or cut into it spiral incisions as it comes into the open cervix under strong traction. The fact that

it is not every fibro-myoma that can be shelled out of its capsule makes it possible to leave behind, either in avulsion or enucleation, pieces of the tumor; these may subsequently slough and poison the patient. The dangers by this method are sometimes scarcely less than hysterectomy, and greater than Tait's operation. When the tumors are of moderate

FIG. 175.

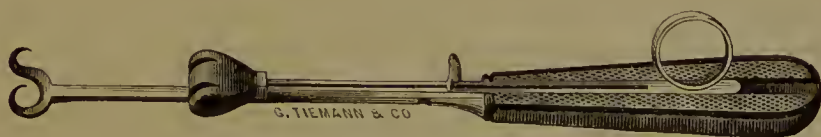


Thomas' Spoon-saw.

size this method promises best, but if the tumor and uterus reach quite to the umbilicus, I would certainly prefer Tait's operation, notwithstanding I have succeeded thus in enucleating very large tumors.

Simple division of the capsule or capsule and cervix with the guarded knife or Paquelin's cautery-knife, and the subsequent free administra-

FIG. 176.



Sims' Tumor-hook.

tion of ergot, may be tried in almost any case, and if the growth is once started from its bed traction will give great aid. Prompt delivery is the only safeguard against septic poisoning. In skilful hands the spoon-saw of Thomas is the most effective of all instruments for the immediate enucleation of the tumor. After the removal of the growth the uterus should be frequently washed out with hot water containing a disinfectant in solution. The surgical treatment of hemorrhage occurring in cases of interstitial and submucons fibro-myomata, prior to the removal of the ovaries and Fallopian tubes, by Mr. Lawson Tait, was confined to division of the cervix uteri and division of the capsule of the tumor, or division of both capsule and cervix at the same time. In division of the capsule the divided blood-vessels retract and become occluded. Why division of the cervix sometimes controls the hemorrhage I cannot explain, but from personal experience I know it does it.

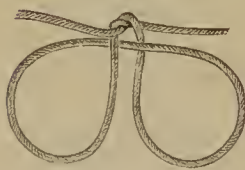
Removal of the ovaries or of ovaries and tubes holds out the greatest promise. After the establishment of the menopause these tumors atrophy by reason of fatty degeneration. The removal of the ovaries or ovaries



and tubes establishes the menopause. Possibly it does more. Removal of the ovaries and tubes is now the established procedure. Mr. Lawson Tait found a monthly bleeding persist after Battey's operation, oöphorectomy, and subsequently included the tubes in his operation. His experience and that of others is that the operation not only arrests the hemorrhage, but that the growth is also arrested, and in many cases disappears in from six to twenty-four months. He considers the time necessary to get the full effect of the operation to be two years. If cystic degeneration has occurred or the growth is malignant the operation does no good. It is to cases of small non-cystic fibro-myomata that the operation is best applicable.

*Tait's Operation—the Removal of Ovaries and Tubes.*—His manner of doing his operation is as follows: The abdominal wall is opened by an incision in the median line above the pelvic symphysis. When the peritoneum is reached, he controls all bleeding in the wound with ordinary hæmostatic forceps. Picking up the peritoneum with a pair of forceps, he makes a small opening in it. Through this he introduces one finger, dilates or tears the peritoneum, and passes in a second finger; with these he explores the pelvis for the ovary, first on the left side; if adhesions exist, he tears them up with the fingers if possible, and brings through the wound the ovary and tube, and holds them with his thumb and fingers as you would a fold of your handkerchief. Through the broad ligament below the fingers, and of course under the tube, he passes a long-handled needle, with an eye near the point, armed with a strong silk ligature, its middle point resting in the needle's eye. He now drops the handle of the needle on the abdomen, and slips his right index finger in between the ligature and the shaft of the needle, and draws the double ligature farther through toward his assistant, who seizes it. He then withdraws the needle. Taking hold of the loop, he carries it over the ovary and tube and places it between the free ends of the ligature, and, winding them round his right hand, draws firmly upon them, and the ovary and tube are at once constricted with a double noose which cannot slip. The following wood-cut (Fig. 177) illustrates this knot, known as the "Staffordshire knot." He now

FIG. 177.



Staffordshire Knot.

seizes the pedicle with a pair or two of hæmostatic forceps to prevent its escape, and a short distance above the ligature cuts the ovary and tube away. Observing that it is secure, he proceeds to treat the right ovary and tube in a similar manner. After carefully cleaning the peritoneal cavity of all blood he closes it. (For further information on this subject I refer the

reader to Mr. Tait's late work on ovariectomy. During the three months I spent with Mr. Tait he operated on account of existing

myoma three times, but for other complications was removing the ovaries and tubes constantly.) The organs were nearly always plainly pathological.

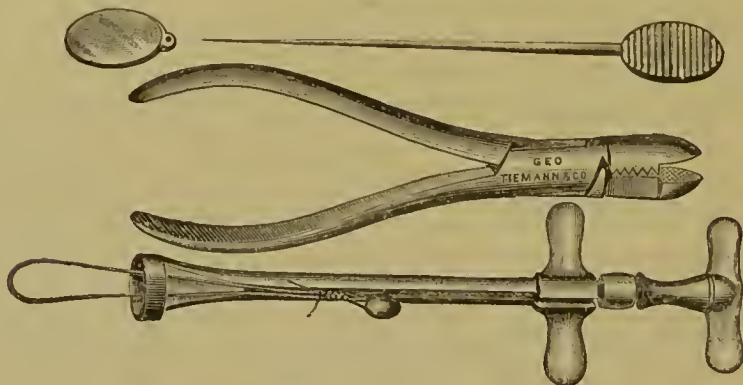
The operation of Mr. Tait, the removal of both ovaries and tubes, is applicable more especially to cases of small or medium-sized interstitial and subperitoneal tumors. When the tumor has become so large as to drag the uterus up and lengthen the cervix sufficiently to make a pedicle of it, supravaginal hysterectomy becomes a feasible and easy operation. Two methods of supravaginal hysterectomy are practised across the Atlantic. One method is characterized by the extra-peritoneal mode of treating the pedicle, and is practised by Dr. Keith, Dr. Bantock, Mr. Lawson Tait, and Péan. The second method is characterized by the intra-peritoneal manner of treating the pedicle, and is followed by Professor von Billroth, Dr. Koeberlé, Schroeder, and Dr. Martin. A case illustrative of Dr. Keith's method: operation, May 3, 1882, by Dr. Thomas Keith, assisted by his son; patient, Miss —, aged nineteen. Ether narcosis; spray 1:40 boroglyceride. Incision as long as possible between umbilicus and pubes; all vessels in the wound carefully ligated. Large globular uterus containing tumor turned out. Large warm sponges pushed into the abdomen in front of and behind the uterus. Warm carbolized compresses (folded towels) were laid over the wound, closely surrounding the neck of the uterus. A clamp was now placed round the neck of the uterus and the ovaries. An extra sponge or two were crowded close into the clamp, and with a knife the uterus was cut away above the clamp. Re-examination of the abdominal wound for bleeding points was now made, and several catgut ligatures were applied. The sponges were removed from the belly and the abdominal wound was closed down to the clamp. The top of the pedicle was now trimmed with the scissors, and small pledgets of carbolized gauze soaked in carbolized glycerin were carefully packed all round the clamp. The pedicle was mummified with a saturated solution of perchloride of iron in glycerin, and it was then covered with more gauze, which extended all over the entire wound. A roll of cotton and bandage completed the dressing. There was no shock, and the patient rapidly recovered.

Up to December 3, 1884, Dr. Keith had done 38 hysterectomies at the vaginal junction; of these 35 recovered and 3 died. Dr. Bantock, a most successful operator in London, operates much after the manner of Dr. Keith, now also in London, securing the pedicle with Koeberlé's "serre nœud" or wire-constrictor (Fig. 178). His results up to the spring of 1883, when I last saw him operate, were excellent, and they still continue to be better than those of any operator following the intra-peritoneal method of treating the pedicle. He uses dry thymol gauze to dress the pedicle, and does not mummify it. On January 31, 1883,

I saw him do hysterectomy for a lady for whom he had removed the ovaries and tubes April 8, 1881. The tumor had continued to grow. Mr. Lawson Tait constricts the pedicle with his own wire clamp.

*Cases by Mr. Lawson Tait.*—Operation June 30, 1882, assisted by

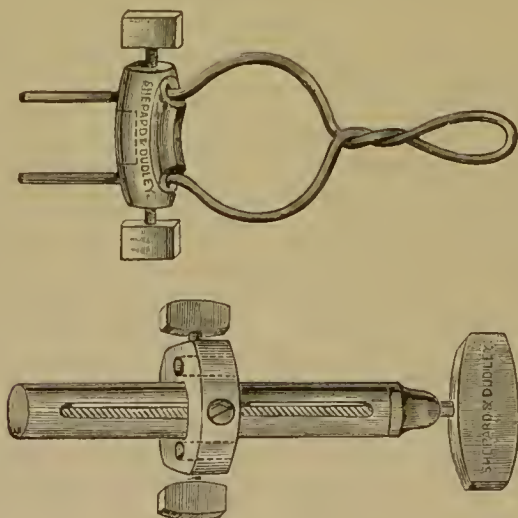
FIG. 178.



Koeberlé's Serre Nœud.

Mr. Raffles Harmer: Miss —, a Jewess. Ether narcosis. Incision very long, extending from pubis far above umbilicus. After exposure of the tumor, which was highly vascular, an enormous plexus of veins from the mesentery were found attached and feeding the growth from

FIG. 179.



Tait's Wire Clamp.

above. These were tied with a coarse, unearbolized silk ligature at two points, and between the ligatures the vessels were divided *en masse*. The tumor was now turned out, and the broad ligaments and tubes were discovered to be spread out over it like wings. An écraseur was armed with a strong cord like a cod-line, or coarser, and the loop was

carried over the tumor and uterus, for such was the mass, down to the neck, and everything within the grasp of the noose was tightly constricted. The whole thing—uterus, tumor, and ovaries—was cut away some two inches above the cord. His wire clamp (Fig. 179) was now adjusted, and more of the mass above it was cut away. The pedicle above the clamp was mummified with perchloride of iron, the cavity of the abdomen was well cleaned, and the wound closed. A dry dressing and roller of flannel completed the operation. The patient suffered severe shock, rallied, and made a good recovery. The tumor and uterus weighed thirty-eight pounds, and the tumor had undergone cystic degeneration. I subsequently saw him remove in the same manner another uterus and tumor weighing forty pounds; the patient died. These were the only large tumors of uterine origin he operated on during my stay of three months in Birmingham.

Péan of Paris and Hegar of Freiburg are the only operators I know of on the Continent who treat the pedicle extra-peritoneally in these cases. I saw Péan perform ovariectomy and other operations, but no hysterectomy. He penetrates the uterus near the os internum, or even lower if the tumor extend downward; wire sutures are drawn into place; the two halves of the cervix are compressed by twisting them, and the pedicle thus formed is fixed in the wound.

Hegar has attained, next to Keith, the best results in supravaginal hysterectomy. He treats the pedicle extra-peritoneally. The tumor is first lifted out of the cavity of the abdomen, and the pedicle is surrounded with Kleeberg's ligature. If the stump be very large, it is ligatured in halves. The mass is cut away above the ligature. The stump is fixed in the lower angle of the wound. Below the pedicle and just above it sutures are passed, uniting only the deeper structures in the wound, and the stitches adjacent to the uterus attach the peritoneum of the abdominal wall to the peritoneum of the stump, around which it is closely fixed. For the distance of two sutures above the stump the deeper structures only are united. Above this point the entire wound is united as usual. A space floored by peritoneum is thus left surrounding the stump. "The projecting end of the stump is thoroughly cauterized; the raw surfaces round it are painted with solution (3-10 per cent.) of chloride of zinc, and cotton wadding which has been soaked in a 2 per cent. solution of the chloride and then thoroughly dried is packed round the stump (Hart and Barbour). Finally, the end of the stump above is touched with a 100 per cent. solution. The whole is covered with protective silk and carbolized wool, and the antiseptic dressing laid on so that it can be easily lifted. The space around the stump is kept thoroughly dry by repeated dressings—three or four times daily, according to amount of discharge—with the chloride-of-zinc wool; the pedicle is pared away gradually with scissors to



diminish its size, to permit the chloride to act more thoroughly, and to prevent pus from burrowing. The elastic ligature is clipped away about the tenth day.

When these tumors contain fluid a trocar is employed as in ovariectomy, and if the tumor is too large to deliver through the incision, already long enough, the tumor is cut to pieces, the pedicle having been secured with an elastic ligature or the wire of the constrictor. The adhesions should be ligated with strong silk at two points, and division be made with the scissors or Paquelin's cauterizer. When these adhesions are heavy they should first be grooved for the distal ligature with strong lock-handled forceps applied with the full force of the hand. Should the bladder be adherent to the tumor in front, it should be dissected down. If intestinal adhesions exist, they should be very carefully tied off before division, and not rudely separated with the fingers, or a bit of the capsule of the tumor may be peeled off and doubled back on its raw surface and stitched along the border. Thus the intestinal adhesions are not disturbed.

The only remaining operator of celebrity of whom I have any knowledge who treats the pedicle extra-peritoneally is Prof. Thomas of New York. He applies a clamp as a safeguard during the operation. Subsequently, he passes a number of strong knitting-needles through the pedicle at right angles above the clamp to support the part after the clamp is loosened. "Then by large cauterizer-irons the tissue above the clamp and needles is thoroughly charred." The clamp is now loosened, but not removed, and is to stand guard against hemorrhages during the further progress of the case.

**INTRA-PERITONEAL METHODS OF TREATING THE PEDICLE.**—The success which has characterized ovariectomy since all operators have returned to the intra-peritoneal method of treating the pedicle has stimulated the operators on the continent of Europe to endeavor to discover a method whereby the stump of the uterus in supravaginal hysterectomy might be left within the peritoneal cavity. Promise of success is already apparent in the experience of Schroeder, Billroth, Koeberlé, and Hegar. Two points were to be attained:

1. To secure the patient against great loss of blood;
2. A method of forming a pedicle free from the danger of subsequent hemorrhage. The method of Professor von Billroth is to leave the stump in the cavity of the abdomen. Ligatures are placed on the blood-vessels as they pass through the uterine ligaments to the uterus. When the ligaments require division they are tied at two points and divided with Paquelin's cauterizer. The neck of the uterus is seized above the vaginal attachment with a pair of powerful lock-handled forceps (Fig. 180) and literally crushed. In fact, I have seen him bite the uterus entirely off with these forceps. In the deep crushed groove thus

made a double ligature is passed through the cervix; each half is firmly tied in the groove and the ligatures are cut short. Above this ligature the uterus is amputated; the sides of the stump are securely stitched together and the stump is dropped in. When the patient is anæmic or loss of blood is a vital point, he compresses the tumor and

FIG. 180.



Wells' Forceps.

uterus with an elastic bandage, after the manner of Dr. Leon Labbé, driving all the blood possible into her body. There is no return of blood to the tumor after the ligatures are tied to the cervix.

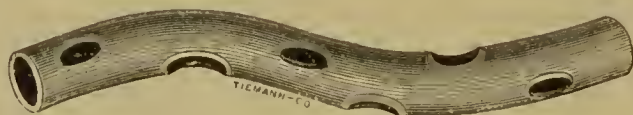
Koeberlé, who instituted the "serre nœud" used in the operation by Dr. Bantock, has abandoned it and leaves the stump of the uterus in the abdomen. Koeberlé told me that he was better satisfied with this than with his former method.

The method of operating pursued by Schroeder was also the intra-peritoneal. He aimed to operate with as little loss of blood as possible, and to secure the pedicle against subsequent bleeding. The first point he attained by means of the elastic ligature, devised by Kleeborg and first applied to the cervix uteri by Dr. A. Martin, placed temporarily around the supravaginal portion of the cervix uteri. If the tumor was a pedunculated, subserous one with a reasonably-sized pedicle, he tied it in halves and cut the tumor away. If the pedicle was short and thick, he cut it off close to the uterus; if interstitial, he cut the capsule and peeled out the tumor or cut a V-shaped piece out of the uterus. When the cut surface on the uterus was too flat to close with sutures, he hollowed it out. The wound in the uterus was then closed with several layers of carbolized silk sutures. The deep layers unite the uterine tissue. The last layer brings the peritoneum neatly over the wound. When the elastic ligature was removed no bleeding occurred. When possible he spared the uterus and its appendages. Tumors developing downward to the cervix and pushing the appendages upward present no pedicle upon which to apply the elastic ligature. In such cases he ligated at two points, and divided between the ligatures the opposing uterine ligaments and blood-vessels. This done on both sides, the tumor or tumors were separated from the surrounding tissues, and the elastic ligature was secured around the base at or above the vaginal junction. The uterus and tumor were now cut

away above the ligature. The open uterine canal was disinfected with a strong carbolic solution, the stump was hollowed out or made V shape, and united with several rows of silk sutures, the last uniting the peritoneum over the stump. A few deep sutures were placed at the sides, to catch, if possible, the points where the large vessels were divided. The elastic ligature was then removed. After a few moments' delay if any bleeding points appeared a few more stitches were put in to control them.

When the tumor has developed from the lower part of the uterus and extended into the cellular tissue, and risen upward, carrying the uterus with it so high that the os cannot be reached per vaginam, a case of the utmost gravity is presented. The surrounding ligaments and vessels are first double ligatured and divided. The elastic ligature is placed around the cervix, the uterus is amputated, and the tumor is shelled out of its bed. The stump of the uterus is treated as above described. The great cavity out of which the tumor was shelled may be left open, or closed, if possible, with sutures, and drained either by the abdominal wound or vagina (Fig. 181). Schroeder preferred the former route. When the bladder is adherent to the front of the

FIG. 181.



Drainage-tube.

tumor and carried high up, he extended the incision to a higher point, and then proceeded to enucleate the tumor from the posterior wall of the bladder. Before closing the abdominal wound the bladder and stump of the uterus were united. Martin operates by methods similar to those of Schroeder.

My own operations in laparotomy have thus far been after Schroeder's methods, learned by observing him operate in Berlin. My cases have been the most hopeless I could select, where it was death or operation: the tumors have been very large, but one being less than fifteen pounds, and in every case a pedicle had to be made, and in all but one there was left a great cavity in the cellular tissue of the pelvis. No case has been lost from secondary bleeding. One was lost from tetanus and one from septicæmia; some recovered. I have practised enucleation per vaginam many times, the tumors ranging in size from a walnut to greater than an adult head. Every case operated has recovered.

It is now apparent to the reader that through laparotomy there are three ways of dealing with uterine fibroids. These are:

1. Supravaginal hysterectomy ;
2. Removal of the tumor, leaving the uterus ;
3. Leaving the uterine and tumor and removing the uterine appendages.

Which method shall be selected? In fibro-cystic tumors entire removal is the only proper method, but such is not always the case with a solid tumor. In my own mind is fixed an axiom which is contrary to the views of many. It is this: *in cases in which a fibroid tumor can be enucleated per vaginam removal of the uterine appendages is an unjustifiable operation.* I feel sure from personal experience that it is not always necessary to unsex a woman because she has a fibroid tumor. My rule has been, if such a tumor was giving a woman no trouble, to let her alone ; and I see no reason for changing that course. I am sure that I have not thus far operated on, by any method, more than one in thirty of the patients who have consulted me. When these tumors are favorably located they do not prevent or render especially hazardous the bearing of children, and they sometimes disappear with the involution of the uterus. Every case of fibroid tumor ought to be considered on its own merits, and no rule of surgical procedure should be applied to all cases, as in cases of ovarian cysts. It is very difficult to find general decisive principles regulating the indications for this operation. A woman may be bleeding to death, suffering pain from mechanical pressure, rendered an object of charity, be dying from nervous exhaustion, the result of her tumor, but the operation suitable for the case will not always be the same. In one case enucleation may be possible ; in another the removal of the ovaries and the tubes may be the proper thing ; in another, supravaginal hysterectomy ; and in another, myotomy.

But I feel sure that a very large number of cases will require no operation, and in this class *restless, officious surgery* is to be condemned. Young women with growing fibroids, if they cannot be removed per vaginam, constitute a most promising class for Mr. Tait's operation, which is a safer procedure than supravaginal hysterectomy or myotomy. The utmost care with reference to any of these operations is absolutely necessary. A clean operator and clean assistants, a clean patient and clean nurses, a clean room and clean tools and sponges, are of the utmost importance. The earlier the removal of the ovaries and tubes is accomplished the better. Once the tumor has attained considerable size, the difficulty of the operation is increased. Early in the disease the incision may be very short, but later an extensive incision may be required. Early in the disease the ovaries and tubes are generally easily reached ; later they are under and behind the tumor, or one may be in view and the other behind or beneath the tumor. In such cases I have been obliged to close the abdomen without removing either.



Both ovaries and tubes or neither should be removed. If the tumor is causing bleeding or growing or affecting the patient's health, and cannot be enucleated per vaginam, the sooner the ovaries and tubes are removed the better.

Tait's operation is recommended by Thomas for large tumors. Done in such cases, the result will always be uncertain, to say nothing of the difficulty of the operation. Large fibroids frequently contain cavities which eventually become growing cysts, and have already contracted adhesions through which they are largely fed with blood. Unless the last clause of this proposition be true, we must ignore every influence in the growth of fibroid tumors except so called ovarian influence. Twice I saw Dr. Bantock do supravaginal hysterectomy in cases where Tait's operation had failed to arrest the growth of the tumor. Such, however, is the ordinary effect of the menopause on these tumors when non-cystic that in cases of women approaching fifty years it is wise to abstain from any operation; but for young women with large growing tumors the reverse is the case. In cases requiring operation, in which it is not possible or desirable to trust to the removal of the ovaries and tubes, hysterectomy by the extra- or intra-peritoneal method should be accomplished. With reference to statistics, the extra-peritoneal method as practised by Keith is the most favorable—viz. 3 deaths in 38 cases. Schroeder's mortality has been 22.5 per cent.; Hegar's, 12.5; and Kaltenbach's, 14.3 by the same method. Dr. Hofmeier, Schroeder's former assistant, states that myotomy, when the uterine canal is not opened, is as favorable as ovariectomy, 5 per cent. covering the mortality, which rises to 15 per cent. when the cavity of the uterus is opened. In the formidable cases of extensive enucleation of the tumors from the pelvic cellular tissue, coupled with amputation of the uterus, the mortality was 57 per cent. When in doubt as to the propriety of operating in many cases by hysterectomy, it is well to recall Keith's language: "Were I anxious for operations I might ere now have done two or three hundred during the last ten years; and from what I know and hear a great number of uterine fibroids are removed, or attempted to be removed, without the slightest necessity." He cites the following as suitable cases for operation:

1. Rapidly-growing tumors in young women;
2. Fibro-cystic and suppurating tumors;
3. Soft, œdematous fibroid tumors;
4. Many cases of large bleeding fibroids of any age;
5. Fibroids surrounded by free fluid, the result of peritonitis, provided the fluid reaccumulates after tapping two or three times.

Dr. Mann, in a valuable paper on the "Removal of Solid Uterine and Ovarian Tumors," advocates the removal of fibro-myomata when they act as neuromata: such cases are doubtless rare, and I can add

my own testimony to his in reference to their importance and indorse his statement: "To leave such patients to a slow, lingering, agonizing death seems to me scarcely justifiable when so good a chance for relief and life seems to be afforded."<sup>1</sup>

Pregnancy and labor are occasionally complicated by the existence of a fibro-myomata. The preservation of the life of the mother may depend upon the removal of the growth, the induction of premature labor, or Cæsarean section. The subject more properly belongs to obstetrics, but a signboard at least may be properly erected here for the student. Dr. James R. Chadwick has published in a paper read before the Massachusetts Medical Society at its annual meeting in June, 1885, a report and summary of 10 cases of pregnancy and labor complicated by existing fibro-myomata. Of these cases, 1 miscarried, 2 died, and 7 recovered; in all of the 7 cases of recovery the tumors were subperitoneal. In the remaining 3 cases the tumors were submucous; two of these died, and the third barely escaped death. The question of surgical operation for the removal of these tumors during pregnancy is not a very difficult one to solve. When the tumor is subperitoneal and pedunculated, pregnancy is not a barrier to its removal. Interstitial and submucous fibroids located above the internal os cannot be attacked without destroying the fœtus, and in such cases the laws of the obstetrician should prevail. When the tumors are developed in the cervix uteri, they should be dealt with according to preceding rules, regardless of the existing pregnancy, provided they are sufficiently large to obstruct labor.

Fibro-cystic myomata are probably more frequent than is generally supposed. Counting the abdominal section for all sorts of tumors which I have witnessed done by other operators, and 65 cases in which I have operated myself, making a total of 196 cases, 8 were fibro-cystic myomata.

Péan and Urdy trace the history of gastrotomy for the removal of uterine tumors through three distinct periods. The first, which comes down to 1843, comprises those cases in which surgeons, having opened the abdomen with a view to ovariectomy and finding the tumors to be uterine, shrunk before the consequences of amputation of the uterus and closed the wound. In the second period, that of trials and groping, which comes down to 1863, during which ovariectomy made great advancement, several surgeons, Atlee, Heath, Charles Clay, and Parkinson, finding uterine tumors where they had expected ovarian, did not hesitate to remove them. In the third period, beginning with April, 1863, Koeberlé, in the presence of a doubtful case, prepared for either ovariectomy or hysterectomy. Storer, Péan, and others deliberately resorted to gastrotomy for the purpose of removing the uterus affected

<sup>1</sup> *Amer. Journ. of Obstet. and Diseases of Women*, vol. xx., May, 1887.

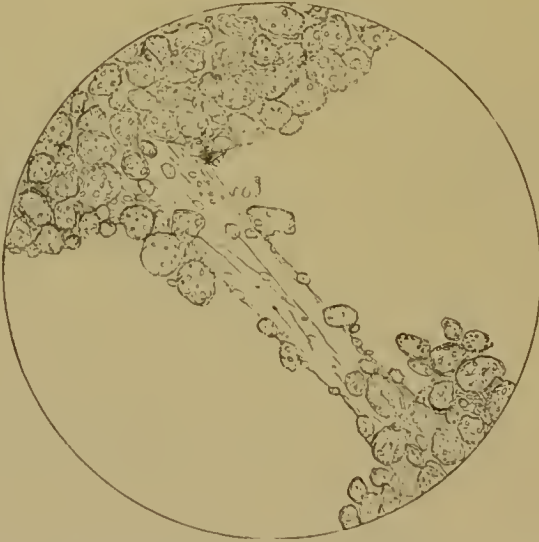
by tumors (Barnes). Forty years have elapsed since 1843, the end of the first period, and we are now only planted firmly on solid surgical ground with reference to these tumors, be they solid or cystic, when they can only be removed by gastrotomy. The credit of this great triumph in surgery belongs very largely to Kimball, Koeberlé, Péan, Keith, Bantock, Schroeder, and Billroth.<sup>1</sup>

### ADENOID GROWTHS.

Johnstone has proved that the endometrium is a glandular structure—that it belongs to the adenoid tissues.

Englemann and Kundrat long ago, after diligent investigation, arrived at the conclusion that it is not mucous membrane. Figs. 182, 183,

FIG. 182.



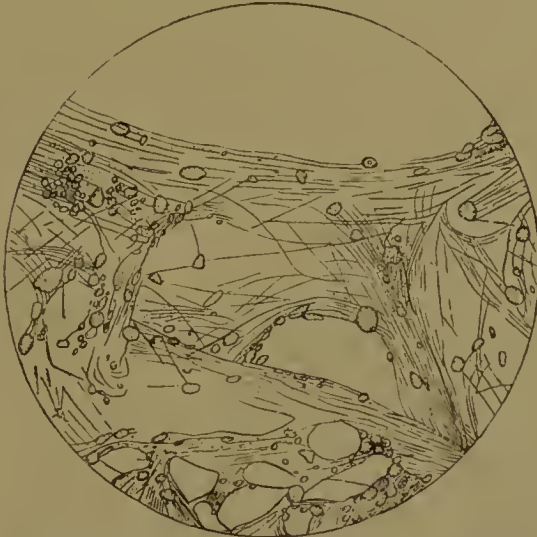
Fibre of the Endometrium and Different Grades of Corpuseular Development ( $\times 3000$ ; after Johnstone: *Brit. Gyn. Trans.*, vol. vii. No. 7).

184 show the glandular corpuseular tissue entirely exhausted; there is nothing left of the former endometrium except its honeycomb-like fibrous stroma. All neoplasms growing from and depending on such an endometrium for the elements of their construction are pathologically and anatomically “adenoid growths.” The lining membrane of the canal of the cervix is a mucous membrane. Underlying this is a layer of loose cellular tissue. Again, beneath that and imbedded in the tissue of the cervix are the glands of Naboth. Neoplasms of the cervix uteri involving in their construction these glands are also “adenoid growths.” Neoplasms of a true mucoid type involving in their construction only the elements of mucous membrane are found growing

<sup>1</sup> For the methods of using galvanism in fibroid tumors, see Vol. I. p. 399.

from the lining membrane of the cervical canal, and, becoming polypoid, constitute the true uterine "mucous polyps."

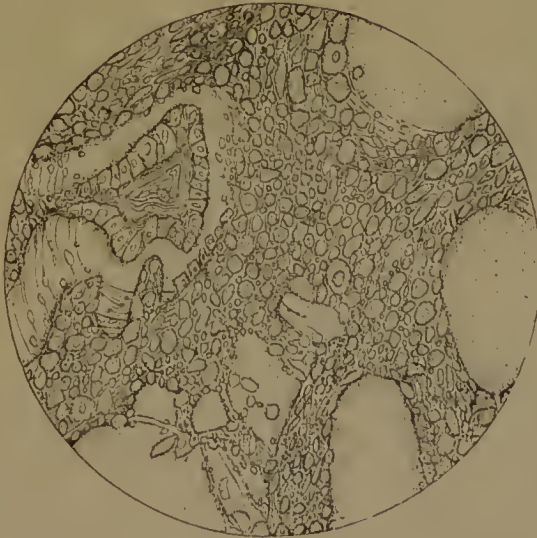
FIG. 183.



Endometrium of a Woman aged Sixty Years. The utricular follicles are all, save one, denuded of epithelium; that one retains its epithelial lining ( $\times 800$ ; after Johnstone).

**PATHOLOGY.**—Chronic inflammation of the lining membrane of the cervical canal and body of the uterus, resulting in hypertrophy of their

FIG. 184.



Endometrium of a Woman aged Twenty Years ( $\times 800$ ; after Johnstone).

histological elements, giving rise to an increased discharge of their normal fluids, and rendering them abnormal in quality, producing a typical



chronic uterine catarrh, is the prime factor in the pathological process resulting in the formation of adenoid growths. The endometrium may be but slightly affected, a simple catarrhal swelling existing, with but little involvement of the utricular follicles. But there may exist a uniform thickening of the endometrium, with involvement of the utricular follicles, or the disease may exist, lacking uniformity of intensity, obtaining in patches. These isolated spaces of diseased endometrium rise above the surface, constituting the sessile variety of adenoid growths. Later, these growths, developing in the

FIG. 185.



Diffuse Papillary Adenoma of Body of Uterus, with Polypi (after Winckel).

direction of the least resistance, may become polypoid in form. But it should be remembered that a difference between a diffuse hypertrophy of the endometrium and a polypoid excrescence of it does not exist. These polypi and the sessile growths have the same histological formation. An ordinary uterine catarrh, chronic in kind, has

been described by Olshausen as "endometritis fungosa." The same disease, of a more aggravated type, affecting more profoundly the utricular glands, has been designated by Schroeder "adenoma uteri diffusum."

Very small pediculated polypi, varying in size from a buckshot to a grape, coexisting with unusually small sessile adenoid growths, are frequently met with in women who are the subjects of uterine catarrh, so often associated with lacerations of the cervix. More rarely we find larger and more complex adenoid growths, pediculated or resting directly upon the endometrium, ranging in size from a chestnut to a hen's egg. Specimens of the smaller variety are usually multiple, often set in clusters, while those of the large kind are ordinarily single. The small ones are probably utricular follicles, closed at the mouth, over-distended, and projecting above the endometrium. The larger variety involves patches of the endometrium, and consequently all of its constituents. The smaller ones are composed of a thin cyst filled with a light fluid, and are easily ruptured by pressure.

When a simple adenomatous polyp has for its foundation a gland of Naboth, the process of development is an enlargement and gradual projection of the cyst above the mucous membrane of the cervix or portio vaginalis. It is observed as a rounded elevation with a broad base, which later gives place to a well-defined pedicle upon which hangs the polyp.

The large variety of adenoid growths may be termed compound, to distinguish them from the simple kind. For their development they depend on patches of the endometrium of clusters of the glands of Naboth. In these growths there is a large quantity of hypertrophied glandular tissue drawn out, and a decided proliferation of tissue, filled with uterine follicles, more or less distended with a fluid of varying consistency. The capsule is thick, and the divisions running through the growths show hypertrophy of the fibrous stroma, originally the framework of the endometrium. This variety may be single or diffuse; usually, however, but one large growth exists, and it is frequently as large as a hen's egg. It is often lobulated, tough, elastic, and irregular in shape. Frequently these growths are attached to the endometrium by a well-defined pedicle; often they stand directly upon it. When a large growth is developed from the glands of Naboth, it involves the constituents of the mucous membrane and underlying cellular tissue, and occasionally the true tissue of the portio vaginalis.

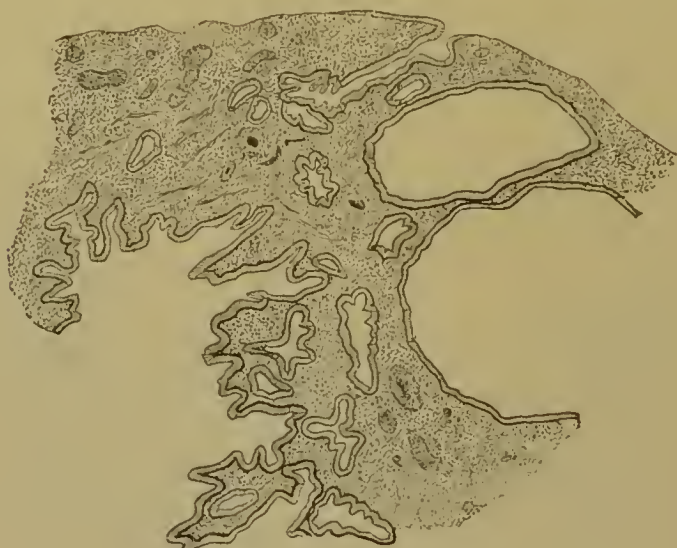
FIG. 186.



Glandular Polyp (De Sinéty).

Such growths contain cavities, dilated Nabothian glands lined with cylindrical epithelium, and constitute the so-called "channel polypus" of

FIG. 187.



Channelled Polyp (De Sinéty).

Oldham. When the growth is made up of Nabothian ovules in different stages of distension, connected by cellular tissue and covered with a thinned mucous membrane, it may present a very irregular shape.

Because of the presence of cystic elements these growths are soft. When adenoid growths are developed within the uterus they are covered with cylindrical epithelium. When developed from the cervix they often present both the cylindrical epithelium from the canal and the pavement epithelium of the portio vaginalis. The blood-vessels on their surfaces are thin-walled and readily bleed. When the growth is intra-uterine and pediculated, it is frequently forced into the dilated cervix, where it is easily seen. When they develop in the cervix, they either dilate and occupy it or hang by a pedicle from one of the lips. "Polypi have already been examined in which there was obvious multiplication of the glands and hyperplasia of the glandular tissue, either with or without dilatation of the glands. These polypoid neoplasms are best classified as adenomata. To this category belong almost all those forms which proceed from the lips of the os uteri, and which have involved the most extreme portions of the cervical mucous membrane."<sup>1</sup>

Mucous polypi of the cervical canal are usually small growths. They are spherical in form, soft in consistence, occasionally flattened, varying in size from a pea to an almond. Generally they contain a sticky fluid; occasionally they are firm in consistency, and such should be

<sup>1</sup> Gusserow: *Billroth's Handbuch*, vol. i.



regarded as papillomata. They may be found pouting from the os uteri, as seen in Fig. 189, or they may be observed occupying the cervical canal.

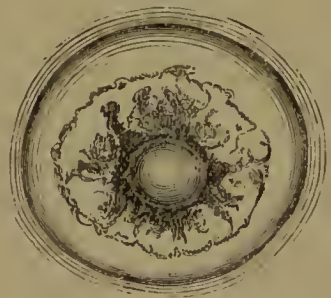
Thomas<sup>1</sup> describes a cellular polypus depending upon a hypergenesis of the cellular tissue beneath the cervical mucous membrane. These growths are pediculated and may attain large size. Barnes<sup>2</sup> describes a "hypertrophic" polypus of the cervix uteri. I regard these growths as identical. Dr. Emmet<sup>3</sup> speaks of a hollow polypus presented by Dr. Henshell of New York. Similar cases are reported by Colombat,<sup>4</sup> who refers to cases by Richerand and Jules Cloquet. Mad. Boivin pictures such a one in her work. This variety of polypus seems to be

FIG. 188.



Glandular Polypus (Thomas).

FIG. 189.



Mucous or Glandular Cervical Polypus.

a cast of the uterine cavity which has been loosened above and expelled into the vagina; still adhering at the cervix, its cavity becomes filled with blood, giving to the mass the polypoid shape. Some authors describe a form of uterine polyp under the caption "placental polyp." These growths are due to the development of bits of retained placenta, and do not originate as neoplasms. They cause all the symptoms of intravaginal growths, and are often discharged with a great loss of blood. When encountered they should be removed with a strong curette or forceps.

**SYMPTOMS AND COURSE.**—The symptoms accompanying all these uterine neoplasms are similar. Bloody and muco-purulent discharges are found constantly. In some instances a "watery flow" is complained of before the onset of menstruation. The bloody discharge may

<sup>1</sup> Thomas: *Diseases of Women*.

<sup>3</sup> Emmet: *Gynecology*.

<sup>2</sup> Barnes: *Diseases of Women*.

<sup>4</sup> Thomas: *Diseases of Women*.



be increased in quantity—menorrhagia—or intra-menstrual bleedings—metrorrhagia—may occur. If the quantity of blood lost be large or the bleedings frequent, the patient becomes anemic. Such a condition is aggravated by exercise or coition, or any cause, such as constipation, conducive to pelvic congestion. The amount of the mucopurulent discharge will depend on the severity of the uterine catarrh which probably gave origin to the neoplasm. Pain is present in proportion to the amount of uterine tenesmus existing. This, in turn, will largely depend on the size of the growth. When the growth has been expelled from the uterus, pain ceases. If the growth be large, vaginal discomfort will be experienced and sexual relations obstructed. Should the pedicle of the growth be very long, the growth will slip through the ostium vagina; and should the pedicle be slender enough, it may be lost spontaneously.

**DIAGNOSIS.**—A woman presents herself with complaints of menorrhagia, metrorrhagia, and leucorrhœa, with severe bearing-down pains at her periods, and a constant backache. She brings with her a typical picture of an intra-uterine growth. Bimanual examination will determine an increase in the size of the uterus. The cervix is probably closed. Dilatation of the cervix with a hydrostatic or metallic dilator should be made, and a finger passed into the uterine cavity will discover the enemy in position. The patient's symptoms may be less typical: she may give none; but upon examination with the finger a polypus may be found lying in the vagina, or with the speculum may be seen protruding from the os externum, or an erosion of the os may be present, and may be suggestive of a small mucous polyp lying in the cervical canal out of sight. Dilatation of the cervix in all doubtful cases ought to be resorted to, and careful exploration should be made with the finger when the uterus is enlarged, and with Thomas' dull curette whether the organ is enlarged or not. The diagnosis, occasionally difficult, will be reached by careful consideration of the symptoms present and by an exact examination of the genital tract, aided by the speculum and dilator. Sometimes the differentiation of these cases of cancer may present some difficulties. The removal of a small portion and an examination by a competent microscopist will settle the question.

**TREATMENT.**—Adenoid fungosities of the endometrium may be easily diagnosed by means of Thomas' dull wire curette, but for their complete removal I prefer the curette of Récamier. The patient should be etherized and placed in the lithotomy position. It is rarely necessary to dilate the cervix, as one or other spoon-shaped end of the instrument will, with safe pressure, pass into the uterine cavity. The curette should be firmly applied to the entire endometrium; the uterine cornua ought not to be neglected. After clearing off all fungosities the endo-

metrium should be treated for some time with local applications of tincture of iodine. Large adenoid growths of the endometrium, pedunculated or otherwise, after free dilatation of the cervix, unless the growth has already appeared at the partially-dilated cervix, should be seized with strong forceps and detached from its base by torsion, curette, or spoon saw.

In attempting to remove these growths I have always experienced difficulty in getting the wire of the *éraseur* beyond the growth. The wire has occasionally parted, and when the growth had been removed by torsion the track of the wire was seen on the tumor. The ordinary volsellum forceps is not well adapted to the removal of polypi, and I have found a better instrument in one designed by the late Dr. Bradley of Burgettstown, Pa., and made by an ordinary country blacksmith. Previous to his death the doctor presented me with his instrument; I use it, and it answers the purpose perfectly.

Pedunculated polypi of firm consistency presenting at the internal os or ostium vagina are treated by division of the pedicle. This may be accomplished with the *éraseur*, galvano-caustic wire, or seissors with plain or serrated edges. Ligation of the pedicle is not necessary. Should some bleeding occur, a hot-water douche, an application of iodine, or a temporary tampon soaked with alum-water will arrest it. Small mucous polypi in the cervix should be snipped off with the seissors or be ruptured with the forceps or curette, and the base immediately painted with tincture of iodine. In making division of a pedicle it is preferable to divide as far from the growth as possible.

Ligation of the pedicle is apt to become a source of septic poisoning, and for this reason should be omitted. It will occasionally happen that a firm cellular polypus presents at the ostium vaginae with such wonderful similarity of appearance to the uterus that it is difficult to decide whether it is one of these growths or an inverted uterus. I have seen the growth implanted in the dilated cervix, the latter beyond my reach, and deception so complete that nothing but an incision into the presenting dome of the tumor revealed the real nature of the object. The case I refer to was sent to me for relief of inversion of the uterus. I removed the growth by torsion, wrenching it from its bed in the funnel-shaped cervical cavity. A week later the patient left the hospital and was in good condition.

Those adenoid growths arising from the glands of Naboth at their earlier stages of development may be arrested by opening the sacs and scraping out their contents, and afterward applying iodine freely to what remains. When they become pedunculated they are to be treated as other growths of that class.

## LITERATURE.

- ATLEE: Paper before American Med. Association, 1853.  
 ATLEE: Paper before International Med. Congress, 1876.  
 BATTEY: writings on *Normal Ovariectomy*, *British Gynecological Transactions*, 1885-86.  
 BYFORD: work on *Diseases of Women*.  
 CHADWICK: *Boston Med. and Surgical Journal*, Nov., 1875.  
 EMMET: work on *Diseases of Women*.  
 KIMBALL: American Supplement to *Obstet. Journal*.  
 PALMER: *American Gynecological Transactions*, 1880.  
 PEASLEE: *Ovarian Tumors*.  
 SIMS, J. MARION: "On Intra-uterine Fibroids," *N. Y. Med. Journal*, 1874.  
 SUTTON: "Removal of Subperitoneal Fibroid through the Posterior Wall of the Vagina," *Chicago Medical Journal and Examiner*.  
 SUTTON: "Enucleation of Fibroid Tumors," *Medical News*, Philada., 1885.  
 THOMAS: work on *Diseases of Women*.  
 BANTOCK, G. GRANVILLE: *British Medical Journal*, 1882.  
 BARNES, ROBERT: *Diseases of Women*.  
 DUNCAN, MATTHEWS: *Journal Reports in Great Britain*.  
 GREENHALGH: *Medico-chirurgical Transactions*, London.  
 HART AND BARBOUR: *Manual of Gynecology*.  
 HICKS, BRAXTON: *Obstetrical Journal of Great Britain and Ireland*.  
 JORDAN, FOURNEUX: *Journal Reports*, Great Britain.  
 KEITH, THOMAS: "Report of Ward XIX. Edinburgh Infirmary," 1883.  
 KEITH, THOMAS: *Hysterectomy for Fibrous Tumors of the Uterus*.  
 MANN, MATTHEW D.: "Removal of Solid Uterine and Ovarian Tumors," *Am. Journ. Obstet. and Diseases of Women*.  
 MEADOWS, ALFRED: *Braithwaite's Retrospect*.  
 MEADOWS, ALFRED: *British Medical Journal*.  
 ROUTH: *Fibrous Tumors of the Uterus*.  
 SAVAGE: *British Medical Journal*, 1886.  
 SIMPSON, SIR J. Y.: *Diseases of Women*.  
 SIMPSON, A. R.: *Contributions to Obstetrics and Gynecology*.  
 TAIT: *Diseases of the Ovaries*, 4th ed.  
 TAIT: *A Thousand Cases of Abdominal Section*.  
 THORNTON: *American Gynecological Transactions*, 1882.  
 WELLS, SIR P. SPENCER: *British Medical Journal*.  
 WELLS, SIR P. SPENCER: work on *Ovarian Tumors*.  
 BILLROTH: *Clinical Reports and Surgery*.  
 CHADWICK: *Ten Cases of Labor complicated with Fibroids*, reprint.  
 GUSSEROW: *Die Neubildungen des Uterus*.  
 HEER: *Ueber Fibro-cysten des Uterus*, Zurich, 1874.  
 HEGAR UND KALTENBACH: *Die Operative Gynäkologie*.  
 HOFMEIER, *Die Myomotomie*.  
 KLOB: *Pathology of the Female Sexual Organs*.  
 LEOPOLD UND FEHLING: *Archiv für Gynäkologie*, Bd. vii. S. 531.  
 SCANZONI: *Diseases of Women*.  
 SCHROEDER: "Gynäkologie," *Society Reports*.  
 SPIEGELBERG: *Archiv für Gynäkologie*, vi. S. 348.  
 VOLKMAN: *Sammlung klin. Vorträge*, No. 98, 1876.  
 WINCKEL: *Ueber Myome des Uterus*.  
 LE BLOND: *Chirurgie gynécologique*, 1878.  
 KOEBERLÉ: *Gazette hebdom.*, 1869.  
 PÉAN ET URDY: *Hystérotomie*, Paris, 1873.  
 DE SINÉTY: *Gynécologie*, 1879.











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